# THE OIL WEEKLY

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SPECIALIZED OIL JOURNALS

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## The Oil Man's Calendar

| | |
|---|---|
| MAY 20 | International Petroleum Exposition Board of Directors, Tulsa. |
| 26–29 | National Association of Purchasing Agents, Chicago. |
| 29–31 | National Oil Scouts & Landmen's Association, Dallas. |
| JUNE 7 | Illinois-Indiana Petroleum Association, Robinson, Illinois. |
| 9–10 | Liquefied Petroleum Gas Association, Pacific Coast Section, San Francisco. |
| 16–20 | American Society of Mechanical Engineers, Petroleum Division, Kansas City, Mo. |
| 19–20 | Pennsylvania Grade Crude Oil Association, Bradford. |
| 19–21 | Twentieth Anniversary Celebration, Arkansas Petroleum Industry, El Dorado. |
| 20–21 | Kentucky Oil & Gas Association, Mid-Year Meeting, Lexington. |
| SEPT. 8–12 | American Chemical Society, Atlantic City. |
| 17–19 | National Petroleum Association, Atlantic City. |
| NOV. 2– 7 | American Petroleum Institute, Annual Meeting, San Francisco. |

# Contents « May 26, 1941

## Volume 101, Number 12


The Changing Panorama..... 7

Feature Section:

Wilson Sees Eastern Shortage Unless "Bottleneck" Removed..... 9

Crude Raises Reflect General Advance of Commodity Prices..... 10
BY L. J. LOGAN

Factors Affecting the Use of Gravel in Oil Wells..... 13
BY KENNETH E. HILL

Treatment of Oil Sands With Surface-active Chemicals.. 21
BY C. F. BONNET

Practical Operating Hints for the Production Man..... 32

Practical Operating Hints for the Drilling Rig..... 36

News Section and Index..... 39

Looking Ahead With the Editor..... 2

Notes for the Equipment Buyer and User..... 70

Squeaks From the Bull Wheel..... 69

Index to Advertisers..... 72



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# THE OIL WEEKLY

MAY 26, 1941

VOLUME 101 NUMBER 12

# The Changing Panorama

THE serious shortage of water-transportation facilities for movement of petroleum from Gulf Coast ports to the Atlantic Seaboard that threatens the industry, as a result government requisition of boats, is due to create critical domestic supply problems. Approximately 1,200,000 barrels of petroleum normally move via tankers from the Gulf Coast to the Atlantic daily, and disruption of this movement likely will result in a shortage of gasoline on the Atlantic and a surplus in the Gulf Coast.

### *Shipping Situation Acute . . .*

It is possible that some of the Eastern United States refineries may be forced to curtail runs to stills, unless the transportation problem is cured before stocks of crude on the Atlantic is depleted. And it is even possible, unless corrected before refined product stocks are reduced too greatly, that a shortage of gasoline might occur in the East. Meanwhile, there will be a surplus of both crude and refined products on the Gulf Coast, which could cause sufficient piling up of stocks as to soften markets in that area.

The situation, already causing great concern, is due to become more acute in the near future. In addition to the 25 tankers recently requisitioned by the government an additional 25 to 50 boats are expected to be transferred to the duty of moving oil from South America to Canadian ports so as to be more conveniently located for Great Britain. A total of 260 tankers are required to move the million plus barrels of petroleum from Gulf ports to the Atlantic, and the number of boats in this service had been reduced to a minimum prior to the requisitioning act.

### *Curative Steps Planned . . .*

The transportation situation demands immediate action on the part of the industry, for its own sake to prevent unfavorable market reactions, for the sake of consumers to see that they are supplied, and for the sake of the nation's defense program to assure an adequate supply in case of war.

Both industry and government seem aware of the importance of quick action. The industry is discussing plans for construction of new pipe lines. There is talk of a large crude oil line, perhaps 21-inch, from the Gulf Coast to refining centers on the Atlantic at a cost of something like $60,000,000. An additional program calls for a large refined product line from the Gulf Coast to the Atlantic, but is being blocked by opposition of railroad interests. The cost of these large lines may appear extremely high, when tanker shipment normally is much cheaper than via pipe lines. However, in case of war, the cost of convoying tanker movements would offset much of the expense—as well as making warships available for other duties. So from a national defense standpoint such investments appear worthwhile.

Another gasoline line that would make it unnecessary for tankers carrying products for consumption in southeastern United States to go around the Florida Peninsula is completed except for railroad crossing, which right, railroads have refused to grant. Pipe has been ordered for a 250-mile crude oil line from Portland, Maine, to Montreal, Canada, which would eliminate the long tanker haul through the St. Lawrence River. Some of the bottlenecks that exist on present transcontinental lines are expected to be looped, which will boost the 40,000 barrels daily capacity currently available. Meanwhile, the industry might be able to use the 3000 idle railroad tank cars owned by oil companies to relieve the immediate situation, although the cost would be high.

Unfortunately construction of such long pipe lines requires both time and much steel. However, it appears that both the industry and government realize the acuteness of the situation and are to take immediate steps to cure it. A fact-finding committee has been appointed from the industry by the A. P. I. at the request of the government. This group, well-informed on conditions, will have some beneficial recommendations. That the government is going to cooperate is indicated by President Roosevelt's assertion that steel pipe would be placed on the preferred priority list, and his urging of immediate Congressional action that would force railroads in southeastern United States to permit oil pipe line systems to cross their rights-of-way.

Sufficient extension of the industry's pipe-line system would free tankships for service with the United States Navy and for shipments abroad, eliminate interference with railroad movement of other commodities that necessarily must go by rail, and practically guarantee delivery of the petroleum industry's essential products in sufficient volume to consuming centers in the east.

### *Tank Car Problems . . .*

The proposal to use the industry's 3000 idle tank cars to temporarily relieve the threatened East Coast shortage is handicapped by several factors.

First, the idle tank cars are all 8000-gallon capacity. There is a scarcity of 10,000-gallon cars Naturally, the smaller cars would require more trains to move a given volume. Second, the railroads apparently do not want the business. Recently a company offered to guarantee a 10-car 100-mile shipment daily for a year, but the railroad was not sufficiently interested to build a spur.

In the third place, rates are too high. Rates of 17 cents per barrel per hundred miles are in existence. Of course, this would be reduced

materially by trainload shipments and longer hauls, but not enough to be economically desirable.

### *Tanker Inefficiency . . .*

Talk was heard during the week that withdrawal of tankers from coast-wise service may disrupt petroleum movement from the Gulf of Mexico to the Atlantic Seaboard to such extent as to cause rationing of gasoline. And at the same time comments were heard on the manner in which England is handling tanker movements which indicate that more efficiency might be the most practical method of improving the tanker situation.

News on the international movement of oil has been soft peddled because it might give aid to Germany, although the sinking of tankers off the coast of Africa would confirm the suspicion that Germany is fully aware of such movements. If England is still moving oil from Iran and Bahrein to the English isle around Africa, this situation alone would put a material strain on tanker facilities. On the other hand long periods of idleness of tankers at convoy points from which oil is moved from the Western Hemisphere to England have again put a terrible strain on the steadily decreasing facilities. Comments have been made during the week that improvement in tanker handling could be made to such an extent that withdrawals of tankers from American coastwise service would not be necessary. We do not know how well informed are the men who make the comments, but we have heard these comments come with such increasing frequency that we are convinced that there is something to them. Maybe the committee which met in Washington to discuss transportation last week took cognizance of them. We hope so.

### *Tanker War Looms . . .*

With requisition of United States tankers for moving oil to ports more convenient for rapid British shipment across the Atlantic, and with indications that Germany's sea activities are currently being directed chiefly against oil boats, the war may become a tanker war.

A Berlin report has asserted Britain's oil-carrying fleet lost 85,000 tons since May 1, with an additional 15,000 tons damaged severely. It was hinted that Nazi submarines were letting freighters pass by whenever there was an opportunity to torpedo a tanker.

### *Pipe and Steel Restricted . . .*

Effective June 10 all orders for tubular goods and all other steel products used by the oil industry must be accompanied by an affidavit saying that during the preceding month the consumption of the product ordered on the part of the company making the purchase was at least equal to the amount being ordered, a new ruling from OPM says. The purpose of the new order is to stop further accumulation of stocks. Suppliers have instructions to fill no orders unless accompanied by the affidavit in duplicate. One copy of the affidavit will be retained by the supplier and one will be sent to OPM. Suppliers are to be required, in effect to report to OPM if they suspect any cusomer of adding to stocks after the new order goes into effect.

Purchases for export are exempted from the regulation.

There is a growing belief that the time is not far away when the OPM will make a study of consumer inventory and possibly take over what the government may deem is an unnecessary surplus, and one hears that more than a few weeks' supply might be considered an undue surplus.

### *Rationing and Substitute Conference . . .*

Conference of the rationing and substitute agency of the OPM, headed by R. E. McConnell, to which oil men have been invited, will be held in Washington May 27 to discuss conservation of steel and possible steel requirements of steel for pipe lines.

The conference, it is understood, will not relate to oil itself, but oil-company representatives will be asked how much steel the industry will need and where savings or substitutions in use of steel can be effected.

### *Line Pipe Situation . . .*

Steel mills of the United States are booked full up to November on pipe line, with inquiries totalling nearly 1,000,000 tons of line pipe on hand. The inquiry on the proposed 24-inch oil line from the Southwest to the Atlantic Seaboard, which later can be converted into a gas line, calls for 500,000 tons.

### *New British Sources . . .*

Spread of the war to the Mediterranean and vicinity of the Near East oil fields has disrupted Great Britain's heretofore principal source of petroleum. Heretofore, Britain has depended to a large extent on Iraq and Iran production being moved via the Mediterranean.

Now that the Mediterranean traffic is being subjected to heavy aerial attacks and fighting is occuring near the Iraq fields, Britain must seek other sources of supply. The most convenient supply centers are those of the Western Hemisphere, and there is expected to be an increased movement of oil from North and South America to England.

### *Divorcement Hearings . . .*

Announcement that public hearings likely will commence June 5 on several federal legislative proposals to divorce various phases of petroleum industry activity, is another example of lack of government foresight. Such action likely would so disrupt operating conditions within the industry that it would prove a serious national defense handicap. It would appear common horsesense not to take any step at this time that would disturb the stability of the one industry generally considered best equipped to fulfill all defense requirements. Moreover, Congress surely has other matters of far greater national importance to consider at this critical time.

## Corings

During the early part of 1939, the year prior to the reduction of import taxes, taxable imports of petroleum and its products into the United States averaged about 70,000 barrels per day. Official government figures for the first two months of 1941 show taxable imports averaging almost 200,000 barrels daily, nearly three times the 1939 level and about 55,000 barrels per day greater than in the corresponding period of 1940 • • • A national survey of secondary recovery installations made for the Interstate Oil Compact Commission reveals the existence of over 550 pressure-maintenance, repressuring, water-flood and cycling projects in 14 states. It is estimated these will increase recoveries by 600 million barrels • • • E. DeGolyer: "The American petroleum industry in 1941 may be faced with a maximum increase in average demand of 20 percent, of which the greatest single item is heavy fuel oil. The industry is able to meet this demand with ease."

# Wilson Sees Eastern Shortage Unless "Bottleneck" Removed

SERIOUSNESS of the situation brought about by curtailed transportation by tankers from the Gulf Coast to Atlantic ports, and initial steps which have been made to confront this problem, were discussed at Chicago May 20 by Dr. Robert E. Wilson, head consultant on petroleum in the Office of Production Management. He was speaking before the American Institute of Chemical Engineers. On the same date President Roosevelt asked Congress for legislation that will facilitate building of pipe lines to the area threatened with shortage (see page 39), and a week before the OPM had been instrumental in formation of an American Petroleum Institute committee to study the matter.

"The situation with regard to petroleum is far different from that during the last war," Dr. Wilson said. "Present gasoline output is about twelve times that in 1916, and our shutdown refinery capacity today is about as large as all our refinery capacity even in 1917. Also, in the field of crude-oil production, supplies available for emergency demands are immeasurably larger than during the last war, thanks to the practice of proration which not only prevents wasteful methods of production but builds up a large reserve available at a moment's notice.

"While the demands of modern mechanized war are very large, and present domestic consumption is of record-breaking volume, there is still plenty of reserve crude and refinery capacity to take care of all predictable defense needs for both the regular and the special products demanded by the new equipment. Continued search for more oil, the construction of newer and better refinery capacity, and research on the improvement of products is of course necessary if the petroleum industry is to maintain its position in the forefront of progress and its ability to meet all needs.

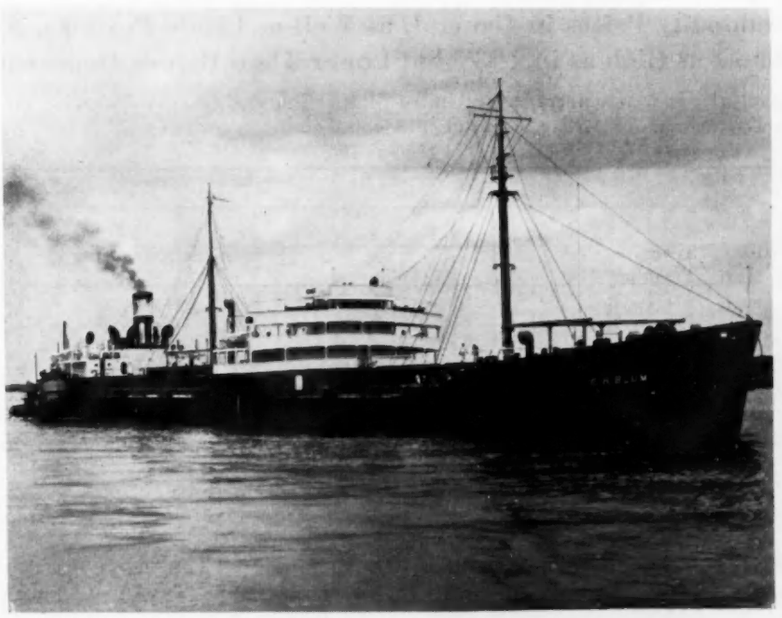
"Only in the field of transportation to the East Coast is there a bottleneck in sight. About 96 percent of the 1,500,000 barrels daily consumption of petroleum and its products on the Eastern Seaboard normally moves thereto by tanker. This requires the continuous service of about 250 domestic tankers moving oil from the Gulf and 40 or 50 coming in from the Dutch West Indies, Mexico and South America. During the last year numerous tankers were transferred to foreign service and 8 large, high-speed tankers were requisitioned by the Navy, leaving a rather tight situation.

"We had been eagerly looking forward to the completion of about 25 new tankers this year as a means of taking care of the growth in demand and meeting Navy needs, but within the past two weeks this has been offset by the urgent request of the Maritime Commission for the immediate transfer of 25 tankers from the American fleet to British supply service.

"Tanker owners have met this request with the prompt and effective action which the American public has come to expect of industry, and most of the desired number of tankers have already been turned over on a pro-rata basis. These tankers will, at least initially, engage in the so-called shuttle service, hauling products

[*Continued on page 49*]

## Newest Atlantic Tanker in Service



**The newest Atlantic Refining Company tanker, the SS. E. H. Blum, after a record run from Port Arthur, Texas, leaving the Delaware River anchorage under escort of tugs for the Point Breeze docks in Philadelphia with a 146,000-barrel cargo of Texas crude oil. The vessel, built in six months at the Sun Shipbuilding and Dry Dock Company yards at Chester, Pennsylvania, is in command of Capt. William L. Evans, a veteran of the Atlantic fleet.**

# Crude Raises Reflect General Advance of Commodity Prices

By L. J. LOGAN, Associate Editor

FOLLOWING the series of increases within the past two months, including the advances of last week, the average price of crude oil in the United States now is within a few cents of the averages for 1937 and 1938, which were the highest of the post-depression period.

Nevertheless, even higher crude prices in coming months appear to be a distinct possibility, unless there is an interruption of the ballooning of prices in general, which is well under way and which has been largely responsible for the advances of the past two months in prices of petroleum products and of crude oil.

In 1937 the average price of crude for the country as a whole was $1.18 a barrel. In 1938 it decreased to $1.13, in reflection of the Mid-Continent reductions of October that year. In 1939 the average was down to approximately $1 a barrel, as the lower postings remained in effect. In 1940 it probably sagged a few cents under $1, in reflection of the 7-cent cut in California postings early in the year and of sharp reductions in Pennsylvania.

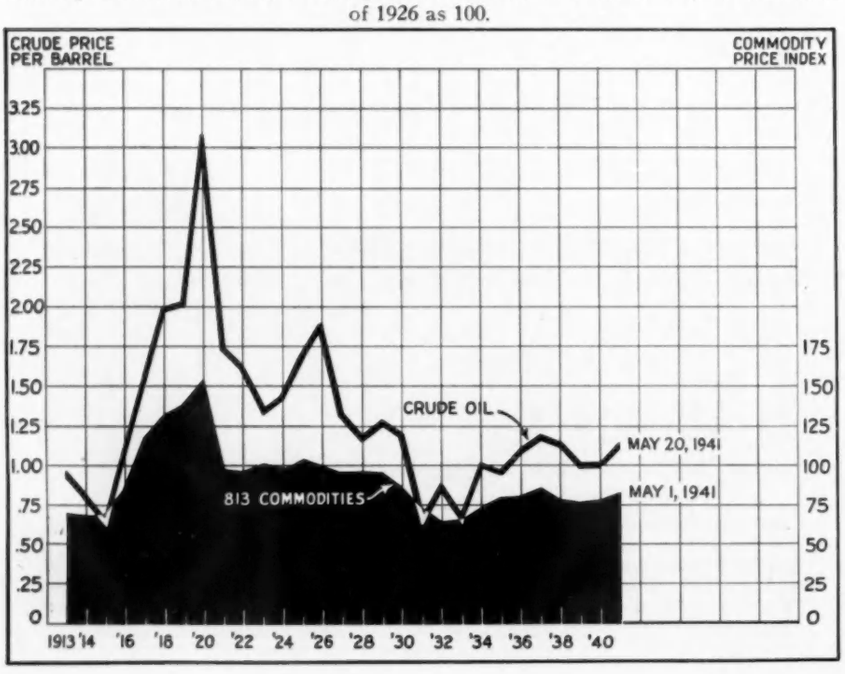
The average price continued virtually unchanged in the first quarter of 1941, but in the advances of April, from coast to coast, it improved probably 6 cents a barrel; and another increase of about 10 cents a barrel was indicated by the raises of that amount last week in the Mid-Continent and the Middle West. The average price at present, therefore, is probably around $1.15 a barrel.

While this average is relatively high for the past decade, it is materially lower than the prices of the 1920's and of the World War period, as indicated in the following table:

| Year | Average Price of Crude in U.S. (Per Barrel) |
|---|---|
| 1913 | $0.95 |
| 1914 | .81 |
| 1915 | .64 |
| 1916 | 1.10 |
| 1917 | 1.56 |
| 1918 | 1.98 |
| 1919 | 2.01 |
| 1920 | 3.07 |
| 1921 | 1.73 |
| 1922 | 1.61 |
| 1923 | 1.34 |
| 1924 | 1.43 |
| 1925 | 1.68 |
| 1926 | 1.88 |
| 1927 | 1.30 |
| 1928 | 1.17 |
| 1929 | 1.27 |
| 1930 | 1.19 |
| 1931 | .65 |
| 1932 | .87 |
| 1933 | .67 |
| 1934 | 1.00 |
| 1935 | .96 |
| 1936 | 1.09 |
| 1937 | 1.18 |
| 1938 | 1.13 |
| 1939 | 1.00 |
| 1940 (Estimated) | .98 |
| 1941: Now, Estimated | 1.15 |

**Commodity Prices in General, as Well as Crude Postings, Are Almost as High as in 1937 but Lower Than Before Depression**

Crude price is yearly average for United States. Commodity price index is that of the Department of Labor, covering 813 commodities at wholesale, on the basis of 1926 as 100.



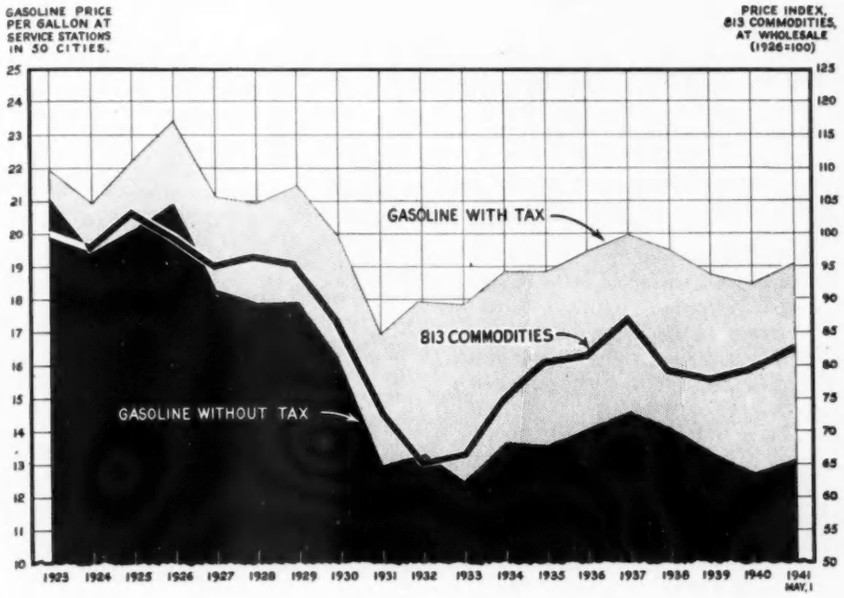

During and after the World War, prices of crude oil were relatively high, in common with the prices of most other commodities; and recent advances have reflected the similar general inflationary effects of the present war.

Commodity prices in general now are increasing sharply, and advances in prices of petroleum products and of crude oil have been made inevitable.

The petroleum industry is having to pay more for the materials it uses in discovering, producing, and refining crude oil, and it also is paying out more for labor, as wages and salaries of oil companies

## Higher Gasoline Prices, Which Have Permitted Crude Raises, Are in Line with Rising Trend of Other Commodity Prices

Chart shows service station prices of gasoline, with and without taxes, and the Department of Labor's price index of 813 commodities at wholesale.


GASOLINE PRICE PER GALLON AT SERVICE STATIONS IN 50 CITIES.
PRICE INDEX, 813 COMMODITIES, AT WHOLESALE (1926=100)
GASOLINE WITH TAX
813 COMMODITIES
GASOLINE WITHOUT TAX
1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 MAY 1

have been generally advanced 5 percent in the past two months.

Operating costs have been increased materially, therefore, from well to service station, and in compensation, it has become essential for producers to obtain higher prices for their crude and for the refiners to obtain higher prices for their products.

A jacking up of the industry's whole price structure has been necessitated by influences beyond the control of the oil companies, and such a lifting now has been consummated, although it remains to be seen how long general conditions will permit maintenance of the present price levels in the industry.

Commodity prices have been increasing since the latter part of last year. The rise was gradual until about two months ago, but subsequently it has been sharp. The Department of Labor's index of sensitive commodity prices has increased more in the past six weeks than in the preceding 12 months. Its index of 28 basic commodities at wholesale gradually advanced from 134.8 (percent of August, 1939) on April 3, 1941, to 137.7 on May 3, and then within a week, that is, by May 10, jumped to 141.7; and the prices subsequently have increased even higher. The department's combined index, covering 813 commodities, naturally is less sensitive, but it also has been moving up steadily.

Wheat has risen 10 cents a bushel in the past three weeks and is now above $1. Cotton, meanwhile, has moved up $8 a bale. Corn has climbed to 75 cents a bushel, the highest price since 1937. Moody's spot commodity index is at the highest level since August, 1937.

Price increases have been greater for farm products than for most other commodities, but in the face of those gains, further increases for all commodities are virtually inevitable. All these increases directly affect oil industry workers, along with the rest of the public, and necessitate payment of higher wages and salaries in the oil industry.

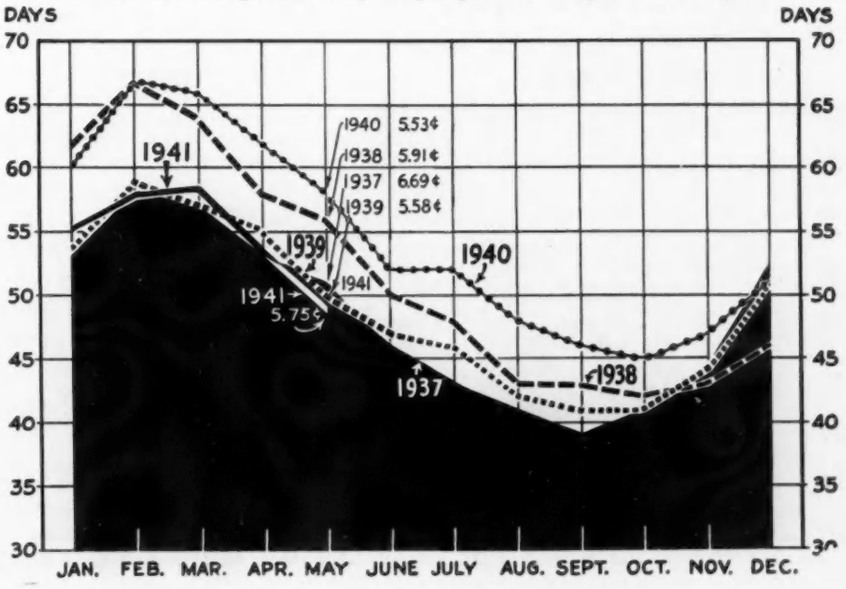
Moreover, materials, equipment, and supplies used by the oil companies themselves are largely in urgent demand in the defense program, and the industry is confronted with not only higher prices for those goods but also a scarcity of them.

Responsible for the advance of commodity prices have been several causes, most of which have grown out of the war in Europe and the defense program in the United States. Those causes have included: (1) increased demand and the prospect of further expansion of demand, (2) scarcities of shipping facilities, (3) increases in wages, (4) prospects of higher governmental pegging of farm prices, and (5) a small increase in the supply of money, consisting of money in circulation and bank deposits. These causes continue to exert their influence, and some economists believe that the general price level will further rise 25 percent within 12 months.

If such an additional increase should occur and at the same time a proportional advance in crude-

## Firm Gasoline Market Reflects Better Inventory Situation, As Stocks on Hand Represent Relatively Few Days' Supply

Chart shows days' supply of gasoline in storage in United States at beginning of month and average tank car price per gallon on May 1 in recent years.



oil prices, postings would go 30 cents a barrel above present levels, and the average price then would stand at about $1.45 a barrel, highest since 1926.

The extent of any further rise in commodity prices actually is, of course, highly conjectural, particularly as the government may at any time step in and set limits on prices. But nearly all economists agree that prices higher than those now prevailing are certain unless the Office of Price Administration and Civilian Supply puts top limits on additional commodities, particularly farm prices, and on wage rates, only five commodities being now covered by price-ceiling orders.

That the federal government soon may intervene has been indicated by the revelation that price-ceiling legislation shortly will be asked of Congress by the administration. The contemplated new law would permit the administration to fix price-ceilings generally and perhaps to regulate wages.

### Oil Situation Favorable

While the war-shaped general situation has provided the foundation for a higher oil-industry price structure, conditions within the industry, following several months of steady improvement, have definitely encouraged the actual remodeling of the structure by a taller pattern.

Demand for petroleum has continued to expand, in the face of war-lost export business, and is proceeding at unprecedented levels. The industry meanwhile has soundly controlled refinery operations, and state conservation officials have restricted crude-oil production within current market demand. Consequently, supply and demand have been well balanced, and oil inventories have been placed generally into economically desirable relation to current and prospective demand.

Throughout the greater part of 1940, gasoline stocks were seriously excessive, and prices weakened to depression levels. But the gasoline situation improved rapidly in 1941, as demand grew remarkably strong, while over-building of stocks was avoided. Measured in terms of days' supply at prevailing rates of consumption, the stocks are as moderate now as at this time in 1937.

Gasoline prices improved a little in the first quarter of the year, and with the coming of spring, entered upon an impressive advance. After having been in December at about the same low levels as in the depression, gasoline prices have improved by now approximately a full cent a gallon, at the refineries and the service stations. Prices are about ¼ cent a gallon higher than a month ago, and are similarly better than at this time last year.

As shown in accompanying charts, stocks of other major petroleum products, as well as those of gasoline, are moderate in relation to prevailing demand, and the inventory situations naturally are conducive to comparatively favorable prices for all the products.

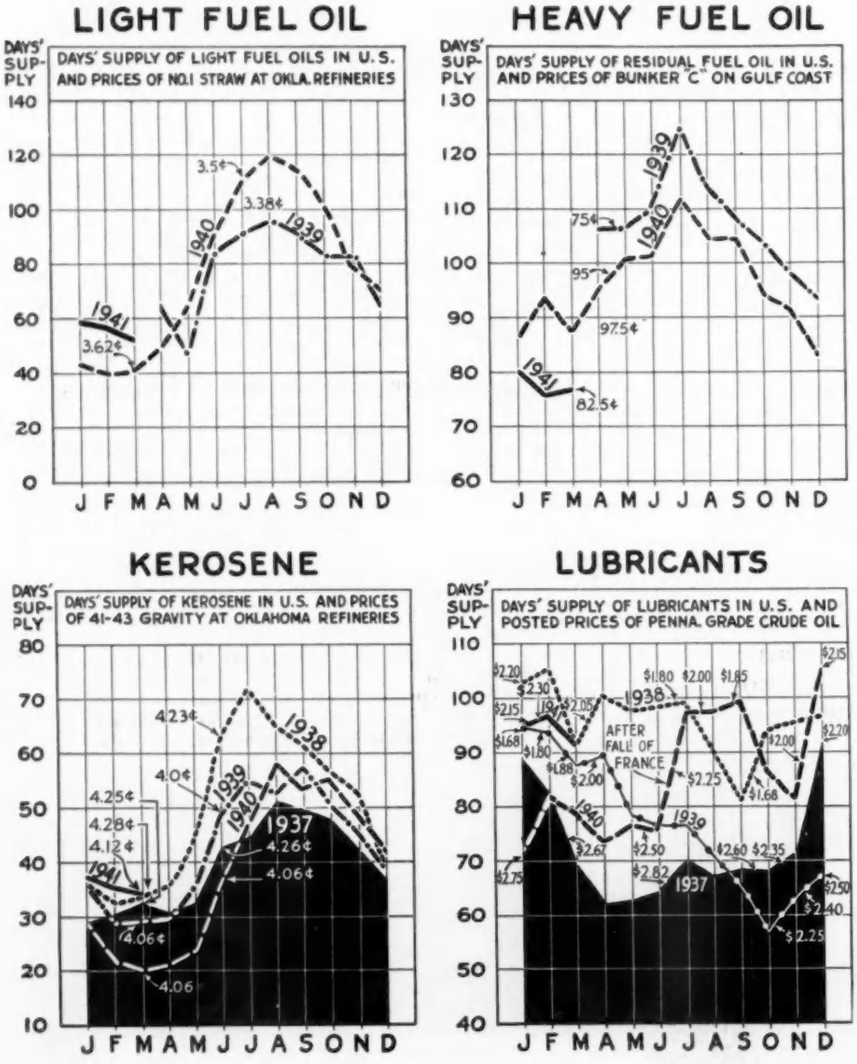
The better prices available to refiners for their products have made it possible for them to pay higher prices for their crude oil, and the actual initiation of higher crude postings has been hastened by a tightening of supplies, brought on by the steady declines of producing ability of fields in Illinois, Michigan, and Oklahoma.

Whereas Illinois previously made a soft crude market, by producing above firm demand, that state in its steady decline has been unable to produce as much oil as the markets would readily have absorbed, and refineries have been forced to go deep into the Mid-Continent for substitute supplies, with Oklahoma fields producing virtually at capacity.

Accordingly, a sellers' market has replaced a buyers' market for crude, and the purchasers have found it necessary to advance postings in order to obtain new well connections or to retain oil connections.

The condition of a tight market for crude is expected to continue, moreover, in the face of last week's 10-cent price increase.

**Moderate Stocks of Other Products, as Well as Gasoline, Promote Favorable Prices of Those Oils and of Crude.**



# Factors Affecting the Use of Gravel In Oil Wells

By KENNETH E. HILL
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**THE use of gravel adjacent to the liners of oil wells is intended to decrease sand production and increase the oil-production rate. Theoretically and practically, both of these purposes can be attained by the use of gravel which has a size ratio of 8 when compared to the diameter of the sand at the 10-percentile point on the cumulative screen analysis. However, due recognition must be given to the fundamental laws underlying the use of the frequency cumulative curves in the choice of gravel size for screening unconsolidated sand. The thickness of gravel should be at least five gravel grain diameters.**

**Preliminary field results indicate that, after initial flush production, gravel-pack wells have higher production rates, better sustained rates, and result in greater cumulative production than conventionally completed offset wells. This is a result of the ability to produce the gravel-pack wells at a greater percentage of their true potential capacity. Productivity indices which are lower for gravel-pack wells than for conventional wells are thought to be due to the use of mud instead of oil as the circulating medium.**

**Decreased sand production and an increased production rate should be obtained from the use of gravel in oil wells, if a uniformly packed closely sized gravel, with a gravel-sand size ratio of not more than 8 and a thickness of at least 5 gravel grain diameters, is placed in the well using oil as the circulating medium.**

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THE placing of a screen of gravel about the liner of a well is essentially a process designed to increase the permeability and porosity of the material adjacent to the well. By means of this process two fundamental benefits should result:

1. A decrease in the amount of sand migrating into the well bore.

2. An increase in the production rate due to increasing the effective well diameter.

Therefore, a gravel screen should provide less resistance to flow, after equilibrium has been established, than would the liner and formation without the gravel. At the same time sand must be prevented from migrating into the well bore.

It is proposed to discuss the aspects of gravel packing under the two benefits mentioned above. Each advantage will be subdivided further into theoretical considerations and practical results.

It has been shown conclusively, both in the laboratory and in the field, that a gravel screen, properly chosen and suitably placed, is effective in preventing the migration of significant amounts of sand into the well bore. A brief résumé of the various phases of this problem will be given herein.

The migration of sand through a gravel screen is a very complex phenomenon, and depends upon a number of variables. The more important of these are the size, replacement and thickness of the gravel, the size and size distribution of the sand, and the hydrodynamic flow conditions.

Probably the most important variable affecting the screening of unconsolidated sand is the ratio of the maximum diameter of a closely sized gravel to a significant grain diameter of the formation sample. Coberly and Wagner[4] found that the most significant grain diameter is that at the 10-percentile point on the cumulative analysis curve of the formation sand. They recommended that the largest grains of a gravel to be used for screening unconsolidated sand

should bear a diameter ratio of not more than 13 to the diameter of the sand at the 10-percentile cumulative screen analysis. For safe and certain screening action a ratio of 10 is to be preferred. These ratios are based on the use of Tyler screens.

This is a purely arbitrary value of the grain diameter of the sand; yet results, with but few exceptions, have been highly satisfactory. Any arbitrarily chosen point on this curve can have an infinite number of curves passing through it. For this reason, further analysis should be made of each cumulative curve before a gravel to screen the given sand is chosen. The cumulative frequency curve can be differentiated graphically to give a frequency distribution curve similar to a probability curve. From this curve the four fundamental measures of the shape of the curve can be obtained:

1. Measure of the central tendency—averages.
2. Measure of variation—standard deviation.
3. Measure of asymmetry—skewness.
4. Measure of peakedness—kurtosis.

The use of these standard statistical devices in the description of sedimentary size distributions must be modified because of three peculiarities in the graphic presentation of sedimentary frequency curves, to wit:

1. Weight is used instead of number of particles as a measure of frequency.
2. The abscissa is a reversed scale of the diameter.
3. The abscissa is also a logarithmic scale of the diameter.

These difficulties have been resolved successfully by Krumbein and Pettijohn[8] and, as a result, the analysis of sediments has been placed on a truly statistical base.

Of the four characteristics of a probability curve listed hereinbefore, the most important from the viewpoint of gravel screening seem to be the last two. The skewness measures the relative concentration of the various sizes, and the kurtosis measures the degree of concentration about the central

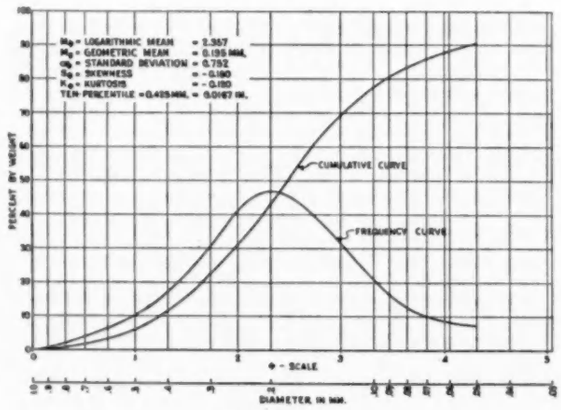


**FIGURE 1**
**Sand A.**

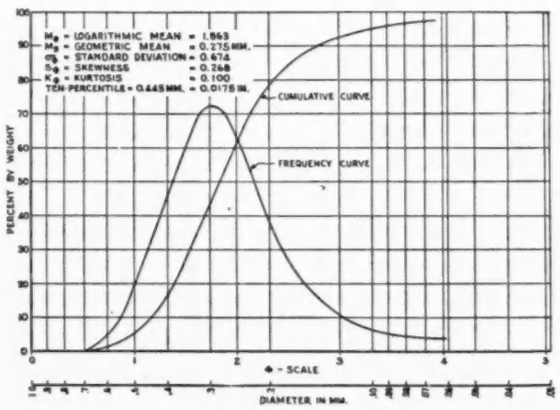


**FIGURE 2**
**Sand B.**

frequency. Although the author has not gone far enough to draw positive conclusions in the application of these methods to the choice of slot sizes in liners and gravel sizes for the screening of unconsolidated sands, it might be suggested that a ratio of skewness to kurtosis would be of fundamental importance. The absolute values of this ratio or similar measures to use in the choice of slot sizes and gravel sizes remain to be determined by lengthy analysis, both experimental and practical.

Figures 1 and 2 show the cumulative and frequency curves for two actual formation sands. These cumulative curves have almost the same 10-percentile point, and the gravel size was chosen by the familiar 13-times rule. The gravel screen for sand A failed to prevent sand incursion; and yet the same screen for the other sand was a success. This might have been due to lack of understanding of the fundamental nature of the cumulative frequency curve. The size of gravel for sand A should have been smaller in diameter, and possibly should have been of more than one size.

The placement of the gravel in the well should assure uniform porosity and permeability of the gravel. Faulty placement may yield poor results even though the gravel size was properly chosen. A tightly packed envelope of gravel must surround the perforated casing completely, because failure of the screen in but one place might lead ultimately to well abandonment.

The thickness of the gravel screen is an important variable in successfully excluding sand. This is especially true when prepacked liners are used. Work done by the author[7] indicates that a thickness equal to the diameter of three grains of gravel is the minimum thickness for successful screening action. This must be a well packed, uniformly sized layer of gravel, with the formation sand as one boundary and the liner as the other. For positive and certain screening action, a thickness equal to five gravel grain diameters should be used. A thickness of 0.5 inch was quite satisfactory in an extensive series of experiments for all gravel sizes smaller than 3- to 4-mesh and over all rates of flow.

The question of whether to choose a gravel size which will exclude completely all sand, or a size which will allow a small amount of sand continually to enter the well, is of importance. If a gravel is chosen sufficiently coarse to allow a small amount of sand to migrate continually into the well bore, the sand within the gravel will result in a greatly decreased permeability of the gravel screen. Furthermore, there is a possibility of a complete failure of the gravel screen because of sand cutting at the point of flow, which might cause slumping and shifting of the pack. It would seem that a finer gravel than specified by the 10-percentile rule should be

used in order that the sand production almost completely would be eliminated. It will be shown later that the use of a fine gravel does not impair appreciably the productivity of the well.

The effect of the rate of flow of the fluid is of importance, but its possible effects have been minimized due to the low rates of production common under proration. Gumpertz[6] states that "the largest grains of a gravel to be used for screening unconsolidated sand over the entire range of flow velocities should bear a diameter ratio of not more than 11 to the diameter of the sand at the 10-percentile cumulative analysis. For flow rates less than 10 barrels per day per foot, this ratio can be increased to 16." Research done by the author[7] indicates that the sand-carrying capacity of a liquid through a gravel medium is directly proportional to the rate of flow in viscous flow. Furthermore, a stable bridge can be broken down if the rate of flow is increased considerably over that prevailing when the bridge was formed. With heterogeneous fluids, it appears that the rate of flow can be stated most simply as the rate of the liquid phase. Results relating rate of flow to screening action, which were very similar to those of Gumpertz, have been obtained using heterogeneous fluids.[7] It seems logical to assume that this relationship would be altered extensively at high gas-oil ratios, although gas wells have been gravel-packed successfully.

The relation of viscosity to the transportation of solid particles through porous media is a direct one. Its effect is not as important as the rate of flow, but the combination of viscosity and velocity is of primary importance in the hydrodynamic phase of screening with gravel.

## Practical Results

Gravel packing of wells to stop sand incursion long has been practiced in completing water wells, but it was not until May 17, 1932, that an oil well was gravel-packed.[3] There was a lull in the use of this method as applied to oil wells until 1937. Since 1937 several hundred wells have been gravel-packed and, with few exceptions, with notable success in the prevention of sand migration into the well.

Clark[2] gave some significant results on this subject:

"It has been found in several fields, even in those containing low fluid levels, that the initial bailing time prior to the production of graveled wells is only 20 percent of the time required to bail all the loose sand from the conventional well. Bailing necessary after completion and during the productive life of the graveled wells appears to require no more than 40 percent and as little as 5 percent of the time required to bail conventional wells.

"Since pump wear is proportional to the amount of sand produced, comparison of costs of pump replacements should give an approximate picture of the efficiency of gravel in retaining sand. In several cases the average cost for pump repairs on a gravel-packed well was only about 40 percent of the cost of a similar group of conventional wells.

"A third means of comparing sand production is comparing maintenance costs due to pulling and bailing. In one case the maintenance cost of gravel-packed wells was about 26.5 percent of that of the conventional wells. In another it was only 11.5 percent. In neither case was there included the value of production deferred or lost during the period of downtime."

Cashion and Markle[3] quote many individual well examples of the effectiveness of gravel screening in excluding sand. The gravel packing of flowing wells to reduce sand production is a successful operation in Southern Louisiana.[1]

Up to August 1940 the Wilmington field had 197 wells packed with gravel.[13a] Of these, 20 are having trouble with sand—16 being gravel-packed, and 4 prepacked; 29.6 percent of the wells gravel-packed had trouble, and but 2.8 percent of the wells prepacked. This excessive difficulty with gravel-packed wells undoubtedly is due to mechanical difficulties, improper choice of gravel size, crooked holes, small clearance outside the liner, etc. These troubles enter while the gravel is being circulated around the liner. If the well is gravel-packed successfully, there is no more sand trouble with these wells than with prepacked wells. Table 1 gives a summary for these wells in the Wilmington field.

The production of water with oil is a factor which causes sand trouble in wells in the Wilmington field. Four wells which were wet when originally completed subsequently were plugged or cemented behind blank liners to eliminate the water trouble. These wells, which now produce an excessive amount of sand, have to be produced at restricted rates of flow, and probably will be recompleted with prepacked liners.

## Conclusions

1. The largest grains of a gravel to be used for screening unconsolidated sand should bear a diameter ratio of less than 10 to the diameter of the sand at the 10-percentile cumulative screen analysis.
2. The minimum thickness of a gravel screen for certain screening action is five gravel grain diameters.
3. Theoretical and practical considerations indicate that a gravel screen, suitably placed and properly chosen, effectively will prevent the migration of significant amounts of sand into the well bore.

The question of whether a gravel screen around the walls of a well will result in an increased production rate is one which has been a subject of much controversy. It is proposed to discuss this from theoretical considerations, and then determine how these considerations hold up in the light of actual field data.

## Theoretical Considerations

It has been stated already that a gravel screen should provide less resistance to flow, after equilibrium has been established, than would the liner and formation without the gravel. The use of a metal screen or liner implies that it must have openings small enough to retain the sand and, at the same time, must not contain enough openings to be structurally weakened. For this reason, metal

**TABLE 1**
**Summary of Wells in Wilmington Field**

| | Original | Re-drilled | Re-paired | Total | Wells Having Trouble | Percent |
|---|---|---|---|---|---|---|
| Gravel-packed wells. | 43 | 5 | 6 | 54 | 16 | 29.6 |
| Prepacked wells..... | 96 | 37 | 10 | 143 | 4 | 2.8 |
| Total..... | 139 | 42 | 16 | 197 | 20 | 9.9 |

screens containing sufficiently small openings to retain the sand will result in large flow resistances due to the convergence of the streamlines into the holes. This is especially true if most of the openings have been clogged with sand and if flow is maintained only through the free slots. In can be seen, therefore, that a gravel screen of the same diameter as the liner of a well may result in decreased flow resistance.

The theoretical advantages of an increased well diameter are well known, having been the subject of several articles.[11, 12] The latest article which has been published is that of Parks,[10] who reaches the conclusion that, theoretically at least, an increased well-bore diameter will increase the production rate. However, the effect of hole size in actual production performance was very difficult to isolate due to the presence of many other variables. The use of gravel packing to retain the theoretical advantages of a large-diameter hole was recommended for wells which are being drilled with small-diameter liners.

The usual form of the radial-flow formula is[9]:

$$Q_o = \frac{2\pi kh(P_e - P_w)}{u \log_e \frac{r_e}{r_w}} \quad \ldots\ldots (1)$$

*Where:*

$Q_o$ = the flux into the well, ml per sec per cm of sand.
k = the permeability, darcys.
h = the sand thickness, cm.
$P_e$ = the reservoir pressure at outer boundary, atmospheres.
$P_w$ = the reservoir pressure at the well, atmospheres.
u = the viscosity, centipoises.
$r_e$ = the external reservoir radius, feet.
$r_w$ = the well radius, feet.

This formula shows that[9] " . . . . to increase appreciably the production capacity of an oil or artesian well by increasing the size of the well is rather impractical, since . . . . it may require an enlargement as high as 40-fold just to double the production capacity." The limitations of this formula must be kept in mind, i.e.:

1. The fluid must be homogeneous.
2. The porous medium must be isotropic.
3. The flow must be laminar.

Furthermore, the increased rate of flow is not necessarily an indication that an increased ultimate recovery will result.

An alternative method of obtaining an increased production rate is to increase the permeability of the material adjacent to the well bore. This is essentially the procedure in gravel packing. Muskat has derived a formula for a radial-flow system of concentrically non-uniform permeability, with the same limitations as above[9]:

$$Q = \frac{2\pi k_g (P_e - P_w) \frac{h}{u}}{\log_e \frac{r_o}{r_w} + \frac{k_g}{k_f} \log_e \frac{r_e}{r_o}} \quad \ldots\ldots (2)$$

The increase in production rate by the effect of increased permeability adjacent to the well is then:

$$\frac{Q}{Q_o} = \frac{\frac{k_g}{k_f} \log_e \frac{r_e}{r_w}}{\log_e \frac{r_o}{r_w} + \frac{k_g}{k_f} \log_e \frac{r_e}{r_o}} \quad \ldots\ldots (3)$$

*Where:*

Q = the flux into the well with a zone of increased permeability adjacent to the well.
$r_o$ = the radius of the external boundary of the gravel.
$k_g$ = the permeability of the gravel.
$k_f$ = the permeability of the formation.

**TABLE 2**
**Effect of Increased Permeability Adjacent to Well on Production Rate.**

| Thickness of Gravel | $\frac{k_g}{k_f}$ | $\frac{Q}{Q_o}$ |
|---|---|---|
| 3 | 1 | 1.000 |
| 3 | 2 | 1.046 |
| 3 | 4 | 1.073 |
| 3 | 20 | 1.095 |
| 3 | ∞ | 1.110 |
| 6 | 1 | 1.000 |
| 6 | 2 | 1.078 |
| 6 | 4 | 1.121 |
| 6 | 20 | 1.158 |
| 6 | ∞ | 1.170 |
| 9 | 1 | 1.000 |
| 9 | 2 | 1.100 |
| 9 | 4 | 1.158 |
| 9 | 20 | 1.210 |
| 9 | ∞ | 1.226 |
| 12 | 1 | 1.000 |
| 12 | 2 | 1.120 |
| 12 | 4 | 1.186 |
| 12 | 20 | 1.250 |
| 12 | ∞ | 1.271 |
| 18 | 1 | 1.000 |
| 18 | 2 | 1.148 |
| 18 | 4 | 1.240 |
| 18 | 20 | 1.321 |
| 18 | ∞ | 1.345 |
| 24 | 1 | 1.000 |
| 24 | 2 | 1.171 |
| 24 | 4 | 1.279 |
| 24 | 20 | 1.376 |
| 24 | ∞ | 1.410 |

**TABLE 3**
**Permeability Range**

| Gravel Size (Mesh) | Range of Permeability (Darcys) | Average Permeability (Darcys) |
|---|---|---|
| 3–4 | 7,200-9,000 | 8,100 |
| 4–6 | 3,400-4,000 | 3,700 |
| 6–8 | 1,700-2,100 | 1,900 |
| 8–10 | 1,000-1,300 | 1,150 |
| 10–14 | 700-900 | 800 |

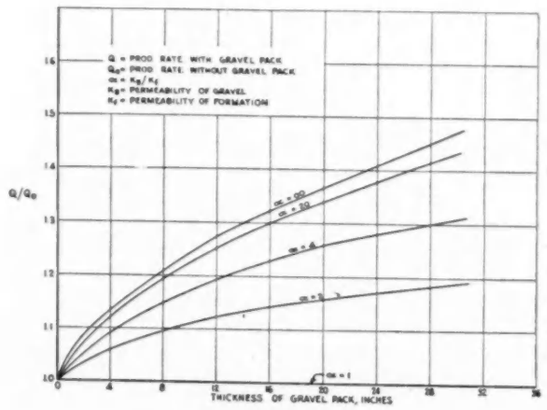
Q = PROD RATE WITH GRAVEL PACK
Qo = PROD RATE WITHOUT GRAVEL PACK
α = Kg/Kf
Kg = PERMEABILITY OF GRAVEL
Kf = PERMEABILITY OF FORMATION
Q/Qo
α = ∞
α = 20
α = 4
α = 2
α = 1
THICKNESS OF GRAVEL PACK, INCHES

**FIGURE 3**
**Effect of Gravel Packing upon Production.**

The other symbols are the same as in equation (1).

It must be remembered that the filtration of sand into the gravel will cut the permeability down appreciably. Furthermore, the flow of heterogeneous mixture of oil and gas will result in a greater pressure loss for a given rate of flow than the formula would lead one to expect. This means that the increase in production predicted by equation (3) will be the theoretical maximum, and must be discounted in actual wells.

Figure 3 shows a graph of $\frac{Q}{Q_o}$ vs. thickness of pack for various values of $\frac{k_g}{k_f}$ with a liner diameter of 6 inches. The calculations are tabulated in Table 2. The effect of an increased permeability adjacent to the well on the production rate are very marked. For a thickness of pack of 3 inches, a permeability increase of 20 times results in an increased production rate of 9.5 percent and an increase of permeability equivalent to infinity will result in only an 11-percent increase. For a 2-foot-thick pack, an increase in permeability of 20 times results in a 37.6-percent increase in production rate, and an increase of only 41 percent results when the permeability increases to infinity around the well bore. Furthermore, the increase in production rate by increasing the gravel thickness from 1 foot to 2 feet, with a permeability anomaly of 20, is only 12.6 percent.

These large increases in production are evidently due to the highly localized character of the pressure drop in a radial-flow system, for equation (1) shows that 50 percent of the pressure drop with a homogeneous fluid occurs in the first 13 feet of formation sand. This same pressure drop will occur in less than 13 feet with heterogeneous fluid.

Thus, from Figure 3 and Table 2, it can be seen that, for zones of small radius, it is necessary only to have small increases in permeability in order appreciably to increase $\frac{Q}{Q_o}$. Furthermore, it is not necessary to have excessively large thicknesses of gravel, because the major proportion of the increase is to be had by higher permeabilities very close to the well.

Few published data are available on the permeability of the gravel pack and on the gravel-sand interface. Coberly and Wagner[4] state that the permeability of an 8- to 10-mesh gravel is about 2500 darcys, and a 10- to 14-mesh sand about 1500 darcys. They also investigated the sand-gravel interface permeability; they found that it was greater than that of the sand itself, but gave no definite values.

The author[7] made a study of this subject. A special core holder was made up giving linear, vertical flow; and the permeability of the sized gravels with a porosity of about 35 percent was determined as in Table 3. The permeabilities of the gravels are tabulated over a range, because the usual meaning of permeability becomes doubtful in the very high ranges. Turbulence undoubtedly enters into the determination of the permeability of gravel beds. Also, the random arrangement of the grains will result in a variation of the permeability of the same gravel with each run. Porosity is also of importance, because an increase in porosity from 35 to 40 percent will increase the permeability by as much as 60 percent.

The permeability of the gravel pack, after equilibrium conditions of sand infiltration and bridging had been reached, was determined; the results are tabulated in Table 4, and plotted as averages in Figure 4. The permeabilities were determined in the air permeameter of the Petroleum Engineering Laboratories of the University of California. An attempt was made to reproduce in all respects the conditions of pack prevailing in a gravel-pack installation in the field. To do this, runs were made in a vertical-flow tube, and the gravel-sand system removed to the permeameter without any disturbance. The permeability of the gravel pack after bridging was obtained by making a run in a vertical-flow tube,

**TABLE 4**
**Permeability of Gravel Bed**
Mixed Sand "B"

| Gravel Size (Mesh) | Gravel-Sand Size Ratio | Average Gravel Permeability (Darcys) | Gravel-Sand Permeability (Darcys) | Average Gravel-Sand Permeability (Darcys) |
|---|---|---|---|---|
| 3–4 | 15.0 | 8,100 | 40-80 | 60 |
| 4–6 | 10.6 | 3,700 | 180-220 | 200 |
| 6–8 | 7.5 | 1,900 | 230-300 | 265 |
| 8–10 | 5.3 | 1,150 | 250-300 | 275 |
| 10–14 | 3.7 | 800 | 200-250 | 225 |

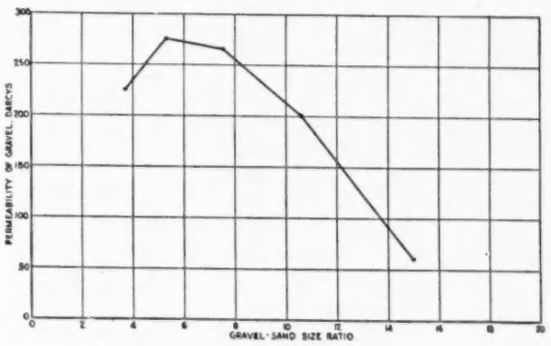


**FIGURE 4**
**Permeability of Gravel Pack After Bridging.**

and then removing all the sand except that which had penetrated the gravel.

The permeability of the formation sand used was about 6.5 darcys, with a porosity of 35.0 percent and a 10 percentile of 0.0175 inch.

The mixed-sand curve in Figure 4 shows a definite peak, with a ratio of 5.3 giving an average permeability of 275 darcys. The worst gravel permeability is that with a ratio of 15.0, which had a permeability of 60 darcys.

This represented a decrease of 99.3 percent in the permeability of the gravel. This is caused by an intensive migration of sand into the gravel caused by poor bridging action. It is to be noted that, although a maximum occurs with a ratio of 5.3, all of the permeabilities from ratios of 10.6 to 3.7 are within 37.5 percent of each other, and are at least 31 times as permeable as the sand. This is probably so because a bridge is formed which does not allow sand to penetrate far into the gravel.

It can be seen that the optimum condition for gravel packing a well from the standpoint of permeability is a ratio of about 8. This corresponds closely with the optimum condition from the standpoint of mechanical bridging, showing that these two factors are related intimately. Also, it is evident that, although the permeability of the gravel envelope is reduced considerably by the infiltration of sand, the permeability of the gravel adjacent to the well after equilibrium conditions have been established is at least 30 times that of the formation sand for all ratios less than 11. This, as a glance at Figure 3 will show, will result in attaining almost all of the production advantages to be gained from the increased permeability around the well. Inasmuch as the use of ratios somewhat less than 11 is desirable from the standpoint of certain screening action, and as all the production increase due to increased permeability adjacent to the well may be obtained for ratios less than 11, it would seem desirable to use a ratio not greater than about 8 for all ordinary conditions encountered in gravel packing a well.

Most wells which are gravel-packed are completed in that manner because of sand problems. The possible increase in production is a secondary and incidental advantage. Field production data on wells which have been gravel-packed are meager, but some information has been obtained, principally from the Wilmington field, California. It must be emphasized that the following data, although the best obtainable, are not of a statistical nature, and any conclusions derived therefrom must be discounted accordingly.

In August, 1939, Clark[2] stated that preliminary results have indicated that the production rates from gravel-packed pumping wells equal, and sometimes exceed, the conventionally completed well. Cumulative production was believed to exceed that of the usual well, but sufficient time had not elapsed to say definitely if this were true.

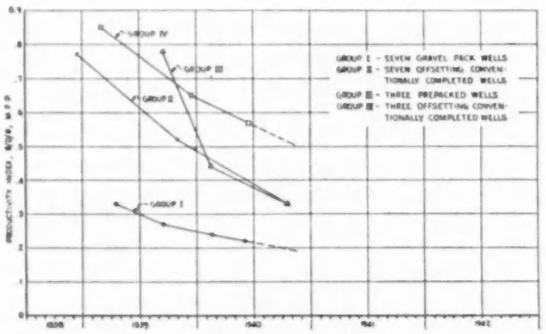
GROUP IV
GROUP III
GROUP II
GROUP I
GROUP I - SEVEN GRAVEL PACK WELLS
GROUP II - SEVEN OFFSETTING CONVENTIONALLY COMPLETED WELLS
GROUP III - THREE PREPACKED WELLS
GROUP III - THREE OFFSETTING CONVENTIONALLY COMPLETED WELLS

**FIGURE 5**
**Productivity Index vs. Time.**

Brasher[1] has given results on the gravel packing of flowing wells in Southern Louisiana. Four wells not gravel-packed were producing 175 barrels per day on the average with much sand, and four gravel-packed wells were producing 356 barrels per day of clean oil from the same producing formation. Furthermore, one well was redrilled and gravel-packed, and production increased from 112 to 290 barrels per day. Cashion and Markle[3] cite the case of two gas wells in the Long Lake field, Texas, which were gravel-packed for use as recycling wells; but the potentials being about twice that of the average for the field, they were placed on production.

An attempt was made to study the production history of gravel-packed and prepacked wells in the Wilmington field, but any comparison of production rates was made difficult by the existence of proration. However, some comparison can be made in the Wilmington town-lot area, where most wells are not curtailed and are producing near their potential. The average production rate of 68 prepacked and gravel-packed wells was 86 barrels per day in August, 1940. The average of 223 wells conventionally completed in the Wilmington town-lot area was 49 barrels per day. This was an average for the 291 wells studied of 58 barrels per day. The value of 86 barrels per day is believed to be somewhat high, because some flush production is included in the 68 wells.[13(a)]

These data show conclusively that the production rates of prepacked and gravel-packed wells are greater than the corresponding conventionally completed wells. However, this is thought to be due to the fact that the gravel-packed and prepacked wells can be produced at a higher percentage of their potential capacity than can the conventionally completed wells. It does not mean, necessarily, that graveled wells actually have increased potentials.

**TABLE 5**
**Effect on the Productivity Index of Recompleting Wells with Gravel Packs**

**1. Run Prepack Liner Inside Present Liner.**
Productivity Index (Barrels Per Day Per Pound Per Square Inch)

| Well No. | Prior | After | Loss | Gain |
|---|---|---|---|---|
| 1 | 0.55 | 0.38 | 0.17 | .... |
| 2 | 0.27 | 0.38 | .... | 0.09 |
| 3 | 0.57 | 0.38 | 0.19 | .... |
| 4 | 0.67 | 0.28 | 0.39 | .... |
| Average | 0.51 | 0.36 | 0.22 | .... |

**2. Redrill and Run Prepack Liner in Old Hole.**

| | | | | |
|---|---|---|---|---|
| 5 | 0.22 | 0.25 | .... | 0.03 |
| 6 | 0.24 | 0.26 | .... | 0.02 |
| 7 | 0.08 | 0.26 | .... | 0.18 |
| Average | 0.18 | 0.26 | .... | 0.08 |

**3. Pull Old Liner, Ream Hole to Larger Diameter, Run New Liner in Old Hole, and Gravel-Pack by Circulation.**

| | | | | |
|---|---|---|---|---|
| 8 | 0.25 | 0.42 | .... | 0.17 |
| 9 | 0.17 | 0.33 | .... | 0.16 |
| Average | 0.21 | 0.37 | .... | 0.16 |

The potentials of prorated wells may be compared by productivity indices. Figure 5 shows the average productivity indices of 4 groups of wells in the Wilmington field.[13(a,b,c)] Mud was the circulating medium used in all of these wells. Tentative conclusions which might be obtained from this graph are:

1. Initial productivity indices for gravel-packed wells are lower than for comparable conventionally completed offset wells.
2. Initial productivity indices for prepacked wells are about equal to those for comparable conventionally completed offset wells.
3. The rate of decline of productivity index, expressed as a percentage of the initial index, is greater for conventional wells than for the gravel-packed wells.

It is becoming a common practice in the Wilmington field to redrill wells giving excessive sand trouble and recomplete with gravel.[13(b)] Data obtained on 13 of these wells in the Ranger zone showed an average production rate of 81 barrels per day, and a water cut of 5 percent for the month just prior to recompletion. After prepacked liners had been run, the average production rate was 151 barrels per day, with a 4-percent water cut for the month immediately after, an increase of 90 percent. The production of these wells was 109 barrels per day with 7 percent water cut on January 15, 1941, an average of 9 months after recompletion.

Productivity indices were obtained on nine of these wells before and after completion. By assuming a linear decline rate in the indices with time, the absolute effect of the recompletion on the productivity index was determined, and is tabulated in Table 5. The circulating medium used in these wells was oil, although on all the jobs aquagel and water were used at one time or another to support the walls. The tabulation, although far from conclusive, indicates that the best method of recompleting wells giving excess sand trouble is to ream the hole to a larger diameter and, after running a new liner, conventionally gravel-pack by circulation. The next best method is to redrill and run a prepack liner in the

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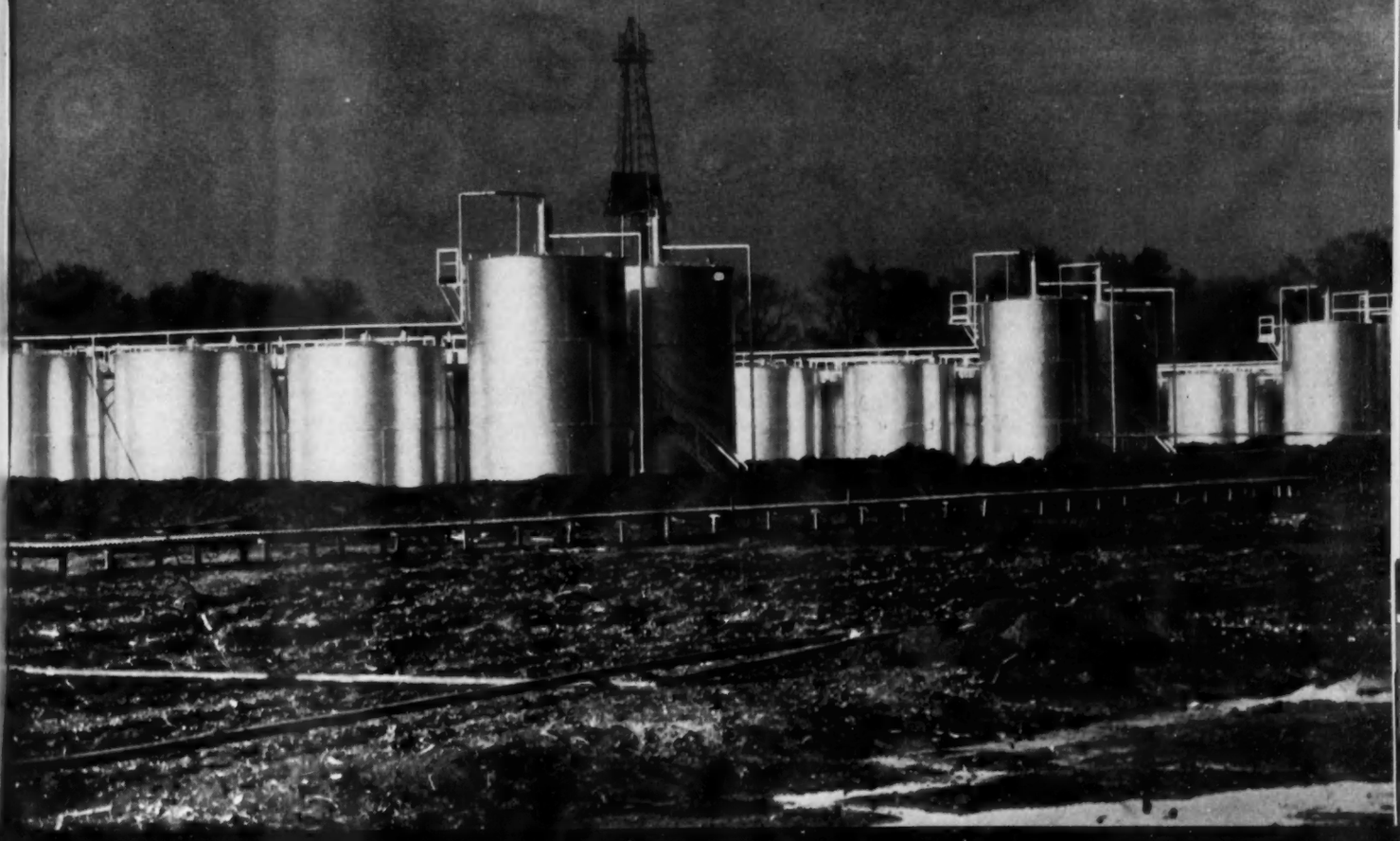

**TABLE 6**
**Cumulative Production for Wells in Fig. 6**

| WELL | Months on Production | Cumulative Production (Barrels) |
|---|---|---|
| 1 | 39 | 94,200 |
| 2 | 33 | 72,400 |
| 3 | 32 | 74,000 |
| A | 42 | 32,700 |
| B | 39 | 63,100 |

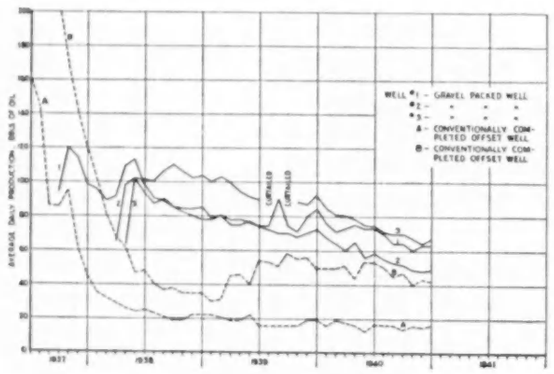
WELL #1 – GRAVEL PACKED WELL
#2 – " " "
#3 – " " "
A – CONVENTIONALLY COMPLETED OFFSET WELL
B – CONVENTIONALLY COMPLETED OFFSET WELL
CAPPED
CAPPED

**FIGURE 6**
**Production Curves Showing Sustained Production Rates from Gravel-packed Wells.**

old hole. The worst method, from the standpoint of productivity, is to run a prepack inside the present liner. This follows logically, because a prepack inside another liner results in a very complicated and energy-wasting path for the fluid and also in a smaller-diameter hole. Furthermore, the satisfactory results obtained by the use of oil as a circulatory medium shows that the principal reason for the lack of attainment of an increased productivity index in gravel packing lies in the use of mud as a circulating medium.

Figure 6 shows the production history of three wells which were gravel-packed early in the history of the Wilmington field as compared with two offsetting conventionally completed wells.[13(c)] Although the gravel chosen for wells No. 1, 2, and 3 allows some sand to enter the wells, the sand problem is negligible compared with that of the offset wells. The graph shows that conventionally completed wells have a higher initial production rate than gravel-packed wells, but also have a much more rapid decline. The gravel-packed wells have a very good sustained production record compared with the offset wells. The cumulative production of these wells is tabulated in Table 6. It can be seen that, although the gravel-packed wells were drilled later, their cumulative production is already considerably above that of the conventional wells, and their economic life is apt to be appreciably longer. For instance, well B and No. 1 were drilled within a month of each other; yet well B has a cumulative production 49 percent greater 39 months after completion.

The use of gravel-packed gas anchors is being tried in the Wilmington field. The gravel is packed, either internally or externally, around the gas anchor placed below the pump. The purpose is to control or strain the sand and shale from the oil at the point of entry into the tubing and at the same time effect an efficient separation of the gas from the oil. The results of this application of gravel in wells are not known as yet, sufficient time not having elapsed.

It might be noted that the field evidence concerning production rates and productivity indices which seem to run contrary to experiments and theory might be a result of incomplete removal of gelled clay from the remote recesses of the gravel. Experiments conducted at the University of California indicate that production rates in a radial-flow gravel-packed system are as much as 360 percent lower when mud is used as the placement medium than when oil is used.[5] When washed thoroughly until the wash water was clean, the production rate still was considerably lower than the rates obtained with an oil-placed medium. This experimental evidence indicates that oil should be the placement medium used with a gravel screen.

## Conclusions

1. The largest grains of a gravel to be used for screening unconsolidated sand should bear a diameter ratio of 8 to the diameter of the sand at the 10-percentile cumulative screen analysis.

2. The major increases in production due to gravel packing may be obtained with increases in permeability of the gravel over the formation sand of 20, and with thicknesses of 12 inches.

3. The improved production record of gravel-packed and prepacked wells as compared with conventional wells is probably largely due to the possibility of producing them at a larger percentage of their potential capacity. Downtime usually is reduced also.

4. Practical results do not always bear out theoretical and experimental predictions of increased productivity due to gravel packing. This is probably largely due to failure to wash the mud, completely and properly, out of the remote recesses of the gravel and away from the formation walls.

5. It is important to use oil instead of rotary-drilling mud for the placement of a gravel screen in an oil well, in order to obtain the increases in production possible by the presence of the gravel screen around the well.

## Bibliography


[1] F. N. Brasher, "Gravel Packing 6,400-Foot Southern Louisiana Flowing Wells," *Oil Weekly* **93 [5]** 22 (1939).

[2] W. A. Clark, "The Application of Gravel Packing to Oil Wells in California," *Petroleum Technology*, Aug. (1939); *Trans. Am. Inst. Mining Met. Engrs.* **136,** 15-22 (1939).

[3] M. L. Cashion and F. B. Markle, "Gravel Packing Oil Wells in the Gulf Coast Fields," *Oil Gas J.* **38 [47]** 48 (1940).

[4] C. J. Coberly and E. M. Wagner, "Some Considerations in the Selection and Installation of Gravel Pack for Oil Wells," *Petroleum Technology*, 1-20 *(American Inst. Mining Met. Engrs. Tech. Pub. No. 960)* Aug. (1938).

[5] J. H. Douma and H. O. Palmer, "A Study of Oil and Rotary Mud in Gravel Packing," thesis for bachelor of science in petroleum engineering, University of California (1938).

[6] B. Gumpertz, "Screening Effect of Gravel on Unconsolidated Sands," *Petroleum Technology*, 1-8 *(Am. Inst. Mining Met. Engrs. Tech. Pub. No. 1195)* May (1940).

[7] K. E. Hill, "A Study of Some Factors Affecting the Screening of Unconsolidated Sands by Gravel in Wells," thesis for master of science in petroleum engineering, University of California (1940).

[8] W. C. Krumbein and F. J. Pettijohn, *Manual of Sedimentary Petrography*, Chap. 4, 7, 8, and 9, D. Appleton-Century Co., New York (1938).

[9] M. Muskat, *"Flow of Homogeneous Fluids through Porous Media,"* 152-7, 403-409, McGraw-Hill Book Co., New York (1937).

[10] E. K. Parks, "Effect of Varying Well-Bore Diameters in California Reservoirs," *Drilling and Production Practice*, 252, American Petroleum Institute, New York (1939).

[11] L. C. Uren and E. J. Bradshaw, "Experimental Study of Pressure Conditions within the Oil-Reservoir Rock in the Vicinity of a High-Pressure Producing Well," *Trans. Am. Inst. Mining Met. Engrs.* **98,** 438-66 (1932).

[12] L. C. Uren, J. Domercq, and J. Mejia, "Influence of Well Diameter upon Pressure Gradient and Rate of Flow of Oil through Reservoir Rock in the Vicinity of a High-Pressure Well," *Trans. Am. Inst. Mining Met. Engrs.* **114,** 25-37 (1935).

[13] Personal communications with: (a) Read Winterburn, petroleum engineer, Union Pacific Railroad Co., Los Angeles, Calif.; (b) T. H. Acres, petroleum engineer, Richfield Oil Corp., Los Angeles, Calif.; (c) E. L. Davis, petroleum engineer, The Texas Co., Los Angeles, Calif.

# Treatment of Oil Sands With Surface-Active Chemicals

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**OIL sands may be treated with surface-active chemicals in order to reduce to a minimum any harmful effects on oil production caused by excess water in the area surrounding a well bore. In planning this treatment, consideration should be given to the physical characteristics of the sand and the effect of pressure differentials upon the flow of the fluids in the sand.**

**Due to their unique effects on the interfacial relationships between water and sand and water and oil, surface-active chemicals may prove to be valuable tools for correcting abnormally poor production from oil wells.**

**Composition and structure of surface-active agents greatly influence their effectiveness for various uses. Selection of effective surface-active chemicals requires correct analysis of conditions that prevail in practical use.**

**Field tests have been conducted under a variety of conditions. Results show that clear-cut benefits from the use of surface-active chemicals can be obtained only if the method of field application and the objectives of treatment are selected properly in relation to the importance of surface and mechanical forces in the reservoir.**

**Recognized limitations and benefits that reasonably can be expected from the use of surface-active chemicals in oil wells are discussed.**

**This paper was presented to Division of Production, before the Eleventh Mid-Year Meeting of the American Petroleum Institute, at the Mayo Hotel, Tulsa, Okla., May 22, 1941. The statements and opinions expressed herein are those of the author, and should not be construed as an official action or opinion of the Institute, nor of this publication.**

THE importance of the forces existing between gas, oil, water, and sand in underground petroleum reservoirs has been recognized for some years.

The various factors that influence flow of gas, oil, and water in underground sand bodies have been studied very thoroughly in recent years by many able investigators. The scope of this paper does not allow review of the details of the research already done; but, without the basic information developed by the painstaking work of many research organizations, it would not be possible to discuss the application of chemicals to producing wells and reach any conclusions of importance. References are given in the bibliography at the end of this paper for those who wish the details.

As it is, the following facts about fluid flow in sand reservoirs are known:

1. Oil production from an oil sand is proportional to the porosity and oil saturation of the sand, and to the permeability of the sand.[1, 2]

2. Oil sands usually contain water,[3, 5] which is considered to surround the sand grains so that the water lies between the oil in the pore spaces and the sand-grain surfaces that form the walls of the pores.

3. When water saturation exceeds 15 percent, the water interferes[1, 2] with the flow of oil and, if enough water saturation exists, water and oil will be produced together.

4. When water saturation of the sand exceeds 80 percent, it is[1, 2] probable that the flow will be entirely water, and no significant volume of oil will be produced.

5. The ratio of water production to oil and gas production[1] is not necessarily the same as the ratio of water saturation to oil and gas saturation of a producing-sand section, but saturation and production tend to reach an equilibrium.

6. Sands deposited in nature are seldom uniform,[4] and usually consist of alternate layers that vary in porosity, permeability, and water and oil saturation.

During production, some streaks of sand become highly saturated with water, whereas other streaks are not proportionately depleted of oil; so that production characteristics of a well represent the cumulative effect of all layers in the sand bed.

For this reason, much of the remedial work on oil sands consists of attempting by various means to cement off water-bearing strata, leaving the oil-bearing zones unaffected.[6, 7, 8]

The fact long has been recognized that sand generally has a greater affinity for water than for oil.[5] Therefore, when water begins to saturate an oil sand, it interferes with the flow of oil. This can be demonstrated by laboratory tests.

The best method of overcoming water encroachment is pressure control, which has been the subject of much development work. Unless sand bodies of fairly uniform permeabilities and containing oil of similar viscosity and gas content are segregated from sands of different characteristics by the method of completion, the pressure-control program adopted for producing a series of zones simultaneously can be determined only by the mean conditions that will give adequate production and do the least harm to the well as a whole. Cementing is used in selective pressure control because, when it is effective, cementing increases the back pressure on sand streaks that tend to flow water instead of oil.

As far as the recovery of oil from oil sands is concerned, it is probably fortunate that sand surfaces are wetted more readily by water than by oil. Under favorable pressure-drop conditions this probably results in the maximum recovery of oil, and is a part

of the force by which edge-water or artificial-water drives displace oil into producing wells.[9]

Under extreme conditions of pressure drop, or when there is a great variation in the permeabilities of interbedded streaks in a sand body, water will displace oil so rapidly in the permeable sections that the drive water finally will channel through to the well. Such an occurrence probably can be overcome only by cementing or by some similar selective method for plugging or back-pressuring the channels that have been formed.

Oil recovery usually is facilitated because of the selective wetting of rock by water and by the interfacial tension between oil and water; yet these characteristics sometimes produce unfavorable results because, when water bypasses oil and reaches the well bore first, the water very likely interferes with the flow of the remaining oil. Although such short-circuiting of water can be overcome by cementing-in water-saturated sand sections, the cost and occasional uncertainty of present methods leaves room for improvement.

### Effect of Surface-Active Chemicals

In this connection, much interest has been aroused by the development of chemicals that will cause very large reductions in the surface tension of water, even though extremely small amounts of these chemicals are used.

Certain experiments[10] have shown that, when oil and water are flowed through a sand body into a well, the ratio of water to oil flowing into the bore continues to increase. Examination of the sand face reveals that more and more of the sand surrounding the well bore is becoming water-saturated, hindering the flow of oil and aiding the flow of water.

On the other hand, if the water in the sand is treated with a good surface-active agent, the reverse will occur. More of the sand surrounding the bore becomes oil saturated, and the flow of water diminishes.

This shows how tests under controlled conditions reveal possible applications for surface-tension depressants in oil production. Perhaps some such treatment can be used some day in connection with pressure water drive, in which there is a small hydrostatic head of water favoring flow of oil from intermediate-size capillaries into a recovery well.

However, except for special cases of artificial water drive, it is difficult to see how we can hope to treat formation water on a large scale; and it becomes apparent that, however interesting the properties of these surface-active chemicals may be, the conditions established by nature in underground oil sands are unlikely to be controlled by such means at an early date.

The investigation described hereinbefore and similar work do have value, because they indicate how surface-active chemicals are likely to affect the oil-water-sand-grain relationship in the sand which surrounds a well bore, and which can be reached by chemical treatment.

Before proceeding to discuss practical experiences and suggests practical applications for surface-active chemicals in oil-well treatment, a brief discussion of the nature of this class of chemicals is necessary.

### Nature of Surface-Active Chemicals

The term "surface-active" is derived primarily from the action of these chemicals in water, rather than in any other liquid. Being, in a sense, semi-soluble in water, these chemicals are not distributed uniformly throughout a volume of liquid, but collect at the boundaries wherever the liquid touches a container or any solid matter immersed in the water, or where it is exposed to air (a gas).

The result of adding such a substance to water is that it collects at the boundaries of the water almost in the fashion of a great many tadpoles with their heads (oil-soluble matter) sticking out into the air, and their tails (water-soluble matter) hanging down in the water. Such chemicals are called "surface-active," because they are primarily effective at the water surface. One effect they cause is to reduce surface tension of water, and so they are called also "surface-tension depressants."

It is not necessary to discuss surface tension in detail, but it has been the subject of much scientific research. It is enough to say that, when the normal surface of water molecules is replaced by these totally different groups of atoms, the physical relationship between the water and anything it touches is changed entirely.

Water normally is slow to penetrate dry powders, like sulfur, or dry fibers, like yarn or thread. The addition of certain surface-tension depressants makes the penetration almost *instantaneous*. In the same fashion, water treated with a powerful surface-tension depressant *instantaneously* penetrates a duck's feathers, displacing the air the feathers normally hold. Also, water-so treated *rapidly* will penetrate porous rock.

To a different extent, the reverse is true. Water contained in a porous substance can be expelled by pressure, and the time to discharge the water to a minimum value often is shortened by the presence of a surface-active agent. The amount of water retained, however, is not likely to be affected much by the presence of a surface-active chemical.

You will notice that the emphasis in these illustrations is on *time*—on the *speed* of displacement rather than on volume which, after all, depends on the space available and the amount of fluid available to fill the space.

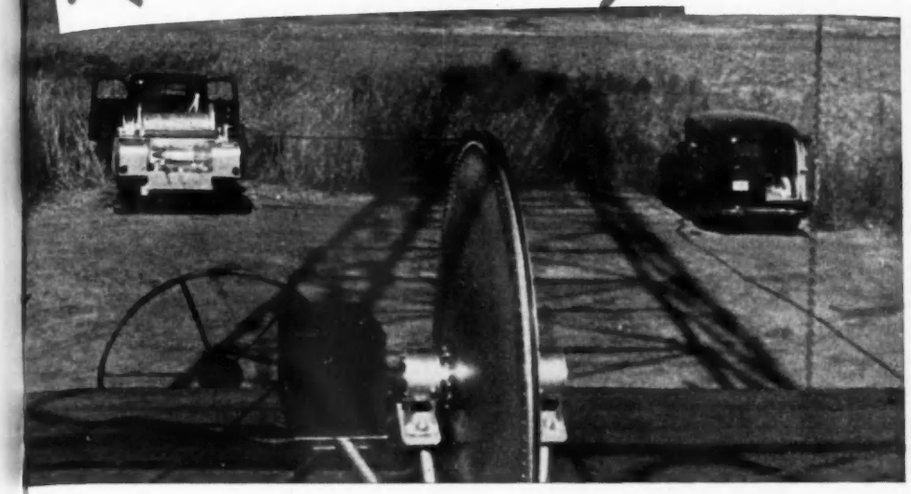
To go just a little further into the nature of surface-tension depressants, or surface-active chemicals: There are many[11] types of compounds that depress surface tension, but low surface tension apparently results from several different kinds of molecular arrangement, and the results obtained in a physical process, such as oil production, depend more on the nature of the chemical used than on the amount of surface-tension reduction alone.

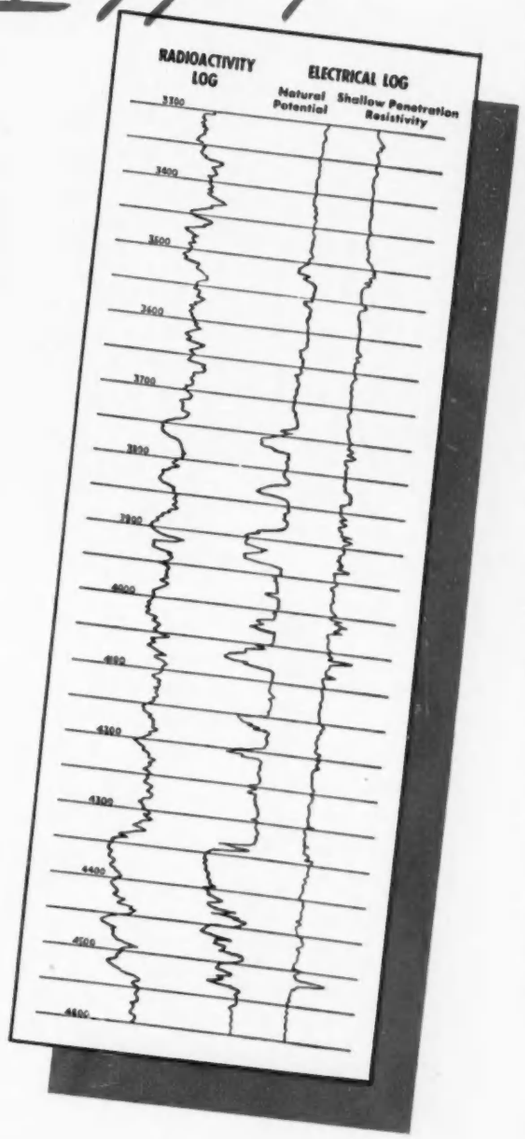
Perhaps the oldest surface-tension depressant is common soap—e.g., sodium stearate, which consists of a sodium-carboxyl (water-soluble) group and a large insoluble fatty group. There are many similar compounds, or pseudo-soaps, that are used for cleaning, scouring, and emulsifying. These compounds are good emulsifiers for dirt, oil, and other non-wettable substances, and are classed as detergents. Others have very little detergent effect and act more as penetrating agents, allowing water to flow freely into and out of small openings.

Many surface-active chemicals form precipitates in the presence of calcium and magnesium. The maximum solubility of the calcium and magnesium salts depends largely on the structure of the chemical. Some of these surface-active agents are so powerful that surface-tension effects can be accomplished with concentrations too low to form precipitates.

Some compounds, instead of being precipitated by

# Radioactivity Well Logging



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The instrument does not indicate fluid content. It does not give a direct indication of the relative porosity of the various sands and limestones found in a well, although, the presence of shale as an impurity in sandstones or limestones may be detected by its high radioactivity.

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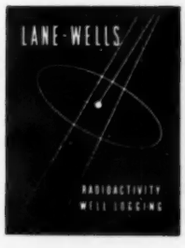


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**TABLE 1**
**Classification of Surface-Active Chemicals**

| Group | Type No. | Formula* | Description | Relative Wetting Power of Best of Each Type as Marketed (Percent) |
|---|---|---|---|---|
| A | 1 | R—COONa | Soaps | |
| | 2 | R—$SO_4$Na | Fatty alcohol sulfates | 23 |
| | 3 | R—CONH$C_2H_4SO_4$Na | Sulfated fatty-acid amides | 5 |
| | 4 | R—COO$C_2H_4SO_4$Na | Sulfated fatty-acid esters | 6 |
| B | 1 | R′$_2$—CH$SO_4$Na | Secondary alcohol sulfates | 25 |
| | 2 | R′—OOC—CHe<br>R′—OOC—C—O—$SO_3$Na<br>H | Sulfated esters of higher alcohols and dibasic acids | Not marketed |
| | 3 | R′—Ar—$SC_3$Na | Alkylarylsulfonates | 6 |
| | 4 | R′—OOC—$CH_2$<br>R′—OOC—C—$SO_3$Na<br>H | Sulfonated esters of alcohols and dibasic acids | 100 |
| C | | | Miscellaneous | 24 |

* R=fatty alkyl group; R′=primary or secondary non-fatty alkyl group; Ar=aryl or a romatic group.

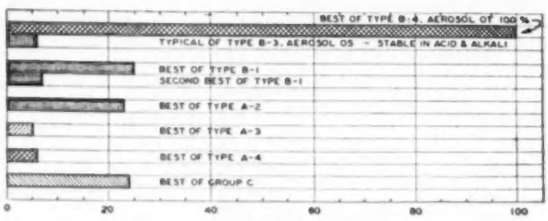



**FIGURE 1**
**Comparative rates of penetrating cotton yarn by solutions of various surface-active chemicals.**

dissolved salts, actually are more effective in strong brine than in fresh water.[13]

Contrast the fact that patents have been issued on the use of some soaps to form precipitates with calcium and plug porous formations that contain brine.

On the other hand, a synthetic surface-active agent is known which will not reduce surface tension except in brine, and which is effective in brines containing up to 20 percent salt.[14] Many surface-active agents fall between these two extremes.

Surface-active organic chemicals may be classified as shown in Table 1.[11] Figure 1[11] shows the comparative rates of penetrating cotton yarn with water

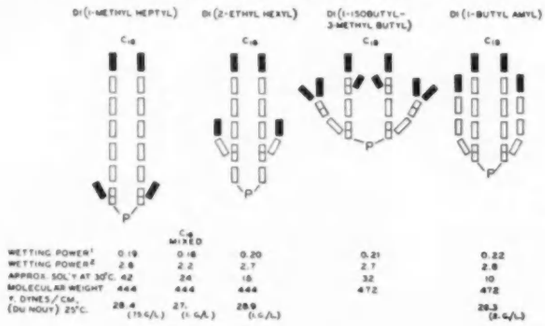

DI(1-METHYL HEPTYL)
DI(2-ETHYL HEXYL)
DI(1-ISOBUTYL-3-METHYL BUTYL)
DI(1-BUTYL AMYL)
C16
C16
C16
C16
MIXED
WETTING POWER¹ 0.19 0.18 0.20 0.21 0.22
WETTING POWER² 2.8 2.2 2.7 2.7 2.8
APPROX. SOL'Y AT 30°C. .42 .26 .15 .32 .10
MOLECULAR WEIGHT 444 444 444 472 472
γ, DYNES/CM., (DU NOUY) 25°C. 28.4 (19.6/L.) 27. (1.6/L.) 28.9 (5.6/L.) 28.3 (2.6/L.)

**FIGURE 2**
**Esters of sodium sulfosuccinic acid, fourth to seventh best wetting agents.**

treated with surface-active chemicals of the various classes.

The comparative merit of surface-active chemicals depends on the conditions of use—i.e., soap is a good detergent, but not a very effective penetrating agent; whereas some reagents considerably enhance the penetrating power of water, without having a very great detergent effect.

It is not unusual to be able to control at will certain properties of synthetic chemicals. If one important property is improved, another less important factor may suffer; but, generally, if we know the conditions to be met, a compound can be selected to accomplish the desired result.

Surface-active compounds primarily effective for

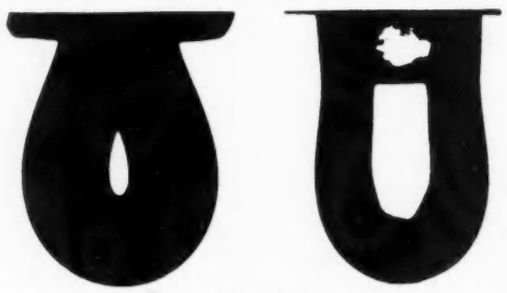


**FIGURE 3**
**Pendant-drop method for measuring surface tension.**

aiding penetration are the esters of sulfosuccinic acid and, therefore, are synthetic organic chemicals. The possible combinations that can be prepared in this form of compound are so great that, from 50 different alcohols, more than 1¼ million compounds of this class can be made. A majority of 1350 different esters have been prepared, and most of them exhibit surface-active properties. Other types of surface-active agents can be made also in homologous series, although most of them do not permit such infinite variations.

Variations in composition or structure result in differences in surface tension, penetration, and other effects. Figure 2 shows the structures of four different chemicals of this type. The configuration is more important than the number of H-C* groups in determining penetrating efficiency. There is no constant relationship between surface tension and penetrating efficiency.

Figure 3 shows the difference in size between two drops of water containing different surface-active compounds. This method is used to measure surface tension. Figure 4 shows reductions in surface tension due to various concentrations of several surface-active compounds. These compounds all have the same molecular weight, but differ in structure, which explains the varying surface tensions at low concentrations.

Figure 5 compares the pendant-drop method to the DuNoüy method for measuring surface tension, and shows the time required for the compounds tested to reach constant surface tension.

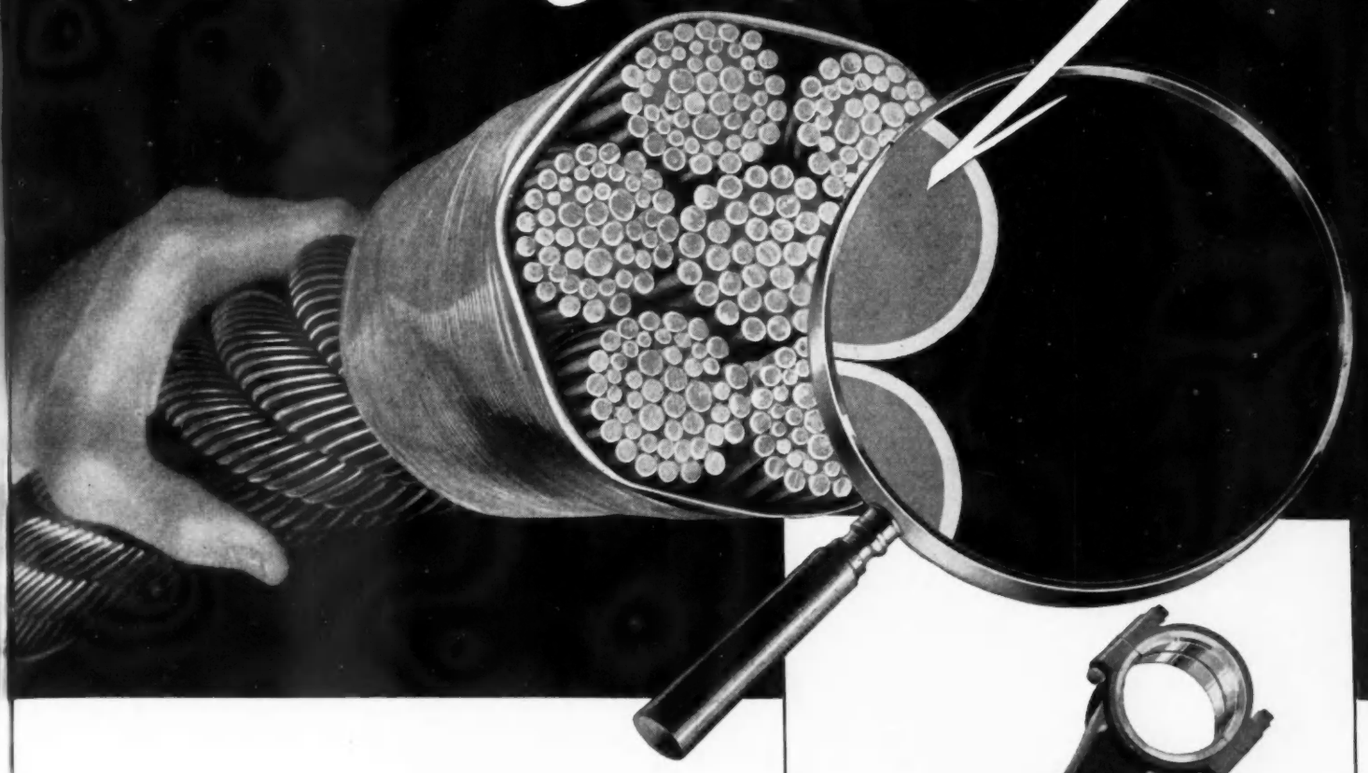
These illustrations show the type of research that is involved in developing one class of surface-active compounds. They show that structure and method of testing have important influences on the selection and effective application of surface-active chemicals.

Assuming that we can select and produce effective chemicals, the next question is: How can they be used to advantage in oil wells?

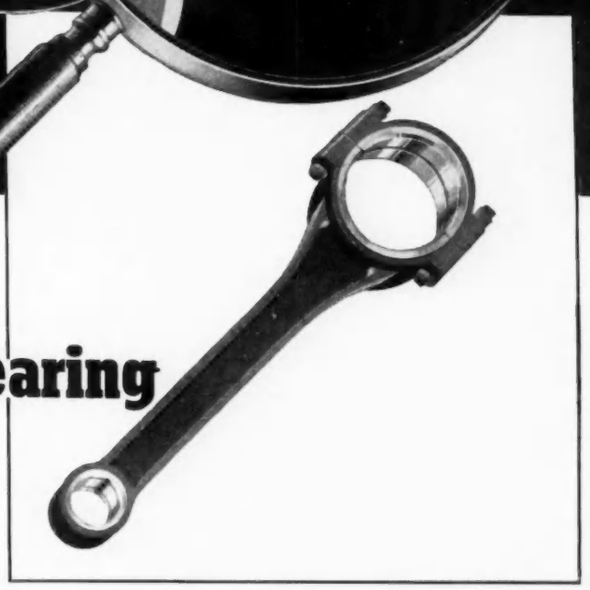
Laboratory tests have shown that the flow of oil through a water-saturated sand will discharge most of the water, if given pressure and time; but, at the same pressure, the water will be discharged in shorter time, if the sand is treated with a surface-active agent

* H-C = hydrogen, carbon.

# This Coating...



## acts like a Babbitt bearing



You know the principle of a Babbitt bearing; a soft metal sandwiched between two hard metals to keep them from grinding and wearing each other in motion. The bethanized zinc coating on a steel rope wire acts in much the same manner.

The bethanized zinc coating is applied to steel rope wire electrolytically. It is 99.9+ per cent pure zinc, ductile as gold leaf and uniform in thickness, both around and along the wire. It is softer than steel, yet so ductile that it acts as a cushion and a lubricant between the wires in the rope.

The bethanized coating may be worn off the crowns of the outer wires in a rope operating over sheaves and drums, but the inner and hidden wires of such a zinc-coated rope remain intact. The portion where corrosion-resistance is vital from a safety consideration is still good.

Use bethanized wire rope for coring, bailing and sand lines in rotary drilling. Use it for your cable-tool drilling and clean-cut lines in sour wells. Because bethanized rope wire is electrolytically zinc-coated and consequently not subjected to detrimental high temperatures, it possesses the same high tensile strength, toughness and fatigue-resisting properties of bright uncoated rope wire. Yet the pure and uniform zinc coating on bethanized rope wire offers maximum resistance to corrosion and corrosion-fatigue.

Bethanized wire rope will not "rust-bind" prematurely as do bright or uncoated ropes. It is a much safer rope, lasts longer, will reduce fishing jobs and make fewer replacements necessary.

BETHLEHEM STEEL

**BETHLEHEM STEEL COMPANY**

**TABLE 2**

| Field<br>Well | A<br>1 | A<br>2 | A‡<br>3 |
|---|---|---|---|
| Total depth (feet) | 2,895 | 3,065 | 2,950 |
| Wash solution, volume, (bbls.) | 50 | 335 | 200 |
| Surface tension of solution (dynes) | 27-28 | 27-28 | 70-72 |
| Completion equipment: liner (inches) | 4¾* | 4¾† | 4¾† |
| Washing equipment | Yowell | Drill-pipe swab | Drill-pipe swab |

**TABLE 2-A**

| Field<br>Well | B<br>1 | B<br>1-a | B<br>2 |
|---|---|---|---|
| Total depth (approx.) (ft.) | 3,200 | 3,200 | 3,200 |
| Wash solution, volume (bbls.) | 10 | 10 | 10 |
| Surface tension of solution (dynes) | 72 | 27 | 27 |
| Completion equipment | † | † | † |
| Washing equipment | Dump bailer | Dump bailer | |

* Gravel prepack. † Gravel-packed by circulation.
‡ Typical well water-washed.

(see Figure 6). Indications are that the ultimate rate of oil flow in each case is about the same.

Now, let us consider field experiences in trials that already have been made.

Records are available of 10 wells treated with low-surface-tension washes prior to completion. A number of other wells, both old and new, have been treated with surface-active chemicals.

A record of the treatments of several new wells is given in Tables 2 and 2-A.

*Example I:*

The primary reason for washing the wells indicated in the tables was to remove drilling mud from

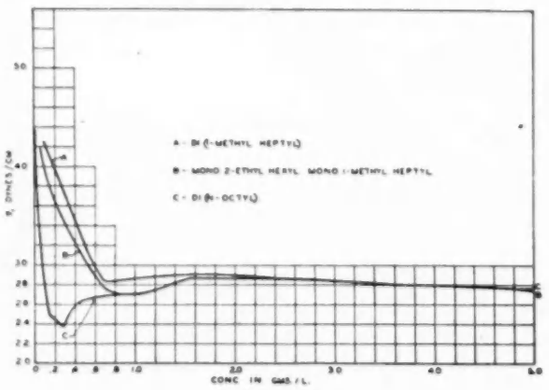



**FIGURE 4**

**Esters of sodium sulfosuccinic acid—DuNouy method (Temperature, 25° C.; Age, 30 sec).**

the gravel pack, and leave the largest possible pore space for oil flow.

All the wells in field "A" were completed in the same sand, but on different structural contours and in different fault blocks, so that no comparison would be made between productivity figures or completion times. Advantages in production were not apparent. Some differences might have been expected in the comparative time of swabbing in the various wells, but the completion times included many variable factors, such as washing time, which in turn depended on the methods used. In all cases, formation pressures were high. Bottom-hole conditions varied according to the structural position of each well; and, although differences existed in production results, these differences could not be attributed only to the type of wash applied.

In field "B" one well yielded good results. On completion with gravel packing washed with water, it produced 20 barrels of oil per day on the pump. The well was rewashed with a surface-active agent, and then produced 100 barrels gross—cutting 30 percent, mostly mud. Inasmuch as well No. 2, completed the same way, did not yield equally good results, it appears that a bridge of mud outside the liner may have washed out in the first case, but not in the second. Three wells were treated, and in all cases there was some increase in production after the wells had been washed with surface-active chemical solution. In this field there is practically no formation pressure.

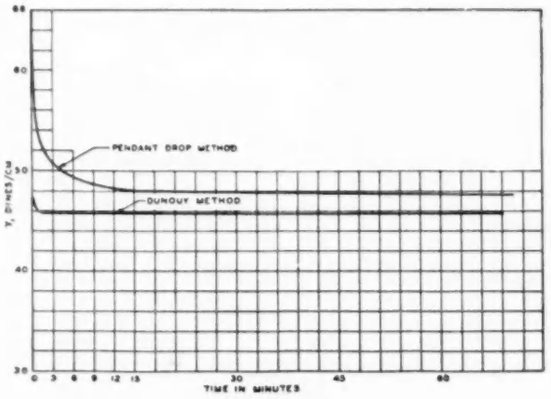



**FIGURE 5**

**Aging of surfaces of solutions of di- (n-octyl-) sodium sulfosuccinate (Concentration, 0.01 grams per liter; Temperature, 25° C.).**

*Example II:*

Another type of new well, treated with low-surface-tension washes, is shown in Table 3.

Figure 7 shows the comparison of these two wells while they were being cleaned up. Well No. 1 was cleaned up more slowly, but produced more water with equal production of oil. The 200-barrel wash used on No. 1 was not squeezed into the formation; but even if 200 barrels is added to the water production from No. 2, the volume is much less than from No. 1.

*Example III:*

A pumping well treated with a surface-active agent gave the following results:

Tubing hung 8016 feet; fluid level at 6700 feet.

**TABLE 3**

| Field<br>Well | C<br>1 | C<br>2 |
|---|---|---|
| Total depth (feet) | 10,969 | 10,669 |
| Wash-solution volume (barrels) | 200 | None |
| Surface tension of solution (dynes per centimeter of water) | 27-28 | 72 |
| Completion equipment: | | |
| Liner (inches) | 5 | 5 |
| Mesh | 300 | 500 |
| Washing equipment | Drill-pipe swab | None |
| Time before turning into tank (hours) | 1 | 5 |
| Days to clean up | 16 | 7 |
| Final cleanup production | 409 | 1,219 |
| Water | 1.0 | 0.3 |
| Emulsion | 0 | 1.0 |
| Gravity (deg. API) | 32.1 | 30.6 |
| Gas (thousand cubic feet) | 249 | 1,144 |
| Tubing choke | 15/64 | 40/64 |
| Tubing pressure (pounds per square inch) | 640 | 390 |
| Casing choke | 15/64 | 40/64 |
| Casing pressure (pounds per square inch) | 1,400 | 1,315 |

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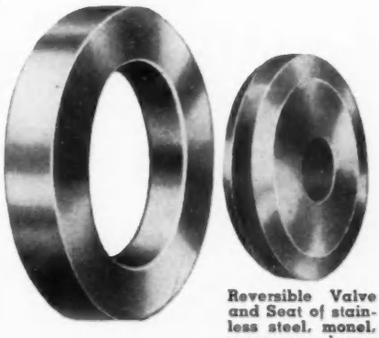

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**TABLE 4**

| Days | Oil (Barrels) | Water (Barrels) | Surface Tension of Water (Dynes per Centimeter) |
|---|---|---|---|
| 1 | 5 | 43 | ..... |
| 2 | 0 | 57 | 30.3 |
| 3 | 16 | 11 | ..... |
| 4 | 21 | 0 | ..... |
| 5 | 21 | 0 | 33.9 |
| 6 | 21 | 5 | ..... |
| 7 | 21 | 0 | 59.2 |
| 8 | 16 | 11 | ..... |
| 9 | 26 | 11 | ..... |
| 18 | Low-pressure trap sample: | | |
| | Unfiltered | | 43.5 |
| | Filtered | | 67.6 |

Equalized 138 cubic feet of solution at 8016 feet (24.6 barrels).

Surface tension of solution—27.1 dynes per centimeter.

Stood 5 days.

Production data as in Table 4.

A test made by adding to thoroughly conditioned drilling mud enough surface-active agent to reduce the surface tension of the water filtered off to only 59 dynes from a normal 72 recently gave interesting results. The mud so treated was spotted opposite an oil sand, and remained there four days, while the well stood with casing cemented. When the well was completed, it came in more easily than comparable wells, and developed excellent production characteristics for the field. The improved results may be due to the loss of water from the mud, and

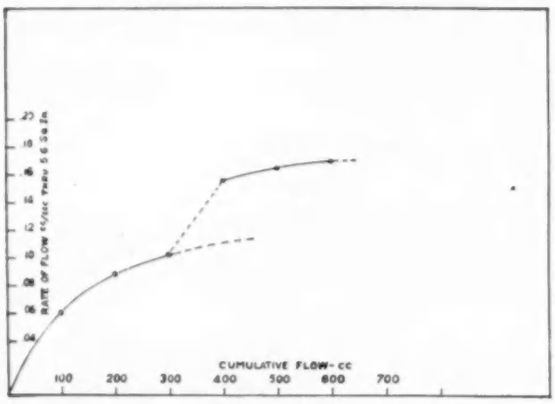


**FIGURE 6**

**Rate of displacement of water from unconsolidated sand by oil, at 1.75 PSI average pressure differential.**

to surface-active filtrate in contact with the sand for a substantial time before completion.

## Conclusions

This and other field work may be summarized by saying that the tests have been quite scattered—only a few tests in each field. Results have been difficult to analyze because of varying conditions, lack of complete data, and lack of a sufficient number of tests in any field to allow comparison of average data.

Field experience to date permits the following observations:

1. The method of applying surface-active chemicals to oil wells is of paramount importance, even in testing. Some tests involved up to 16 hours' rig time merely for mixing large volumes of solution and washing. Frequently, special washing and pumping equipment was involved. In some cases, volumes of solutions exceeded 400 barrels. The cost of chemicals has not been a large part of the cost of treatment, but many treatment tests have cost the operators more than $1000 each. It is difficult to conduct many such tests unless they are strikingly successful. Less expensive methods of application can be worked out, so that field applications at moderate cost can be made widely and repeatedly.

2. Because of recognized penetrating, emulsifying, and dispersing properties, surface-active agents have been tried for the removal of gelled and caked mud opposite pay formations. Over considerable contact periods, and when mud has been dehydrated thoroughly—both by filtration and by oil—the penetrating effect may be of some value. On the whole, however, these chemicals show little promise of being effective for removing mud. In any case, removal of mud cake must involve intense agitation and, perhaps, considerable volumes of solution. Repeated treatment with different chemical solutions

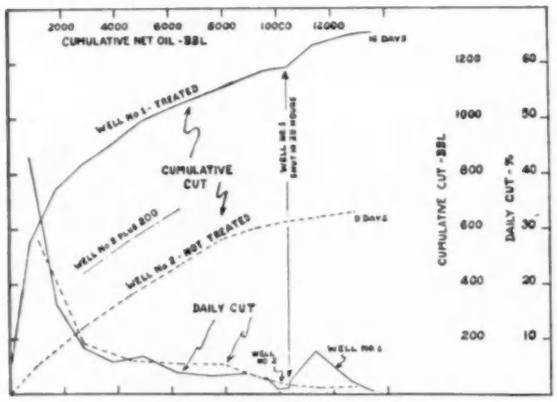


**FIGURE 7**

**Results of well treatment (American Cyanamid and Chemical Corporation).**

may help. Time of contact and *time,* as well as degree, of agitation are of equal or greater importance than the chemicals used. Here again, cost is a factor, as time may be the greatest element of treatment cost. Gravel packs are especially difficult to clean, as their physical nature resists agitation and rapid circulation through the gravel.

3. Indications are that, after treatment with a surface-active agent, an equal volume of water will be recovered more quickly than when plain water is used. Often more water is recovered with the initial production after surface-active treatment. Surface-active treatment seems to have little effect on final production, although it may aid in the rapid and more uniform elimination of filtrate water from the sand face of the well bore. Depending on the nature of the sands, this may result in a cleaner well, a well less subject to early short-circuiting of formation water (unless great variations in sand permeability exist); and, temporarily at least, may result in higher ratios of oil to water, when these are produced together. When low or moderate pressures exist, surface-active treatment may shorten the time for bringing a well onto production, but maximum potential is unlikely to be increased except in comparison to wells that have encountered difficulties in drilling in or in completion and thus have been badly water-blocked.

The elimination of filtered water from the sand face may be of more than superficial importance in

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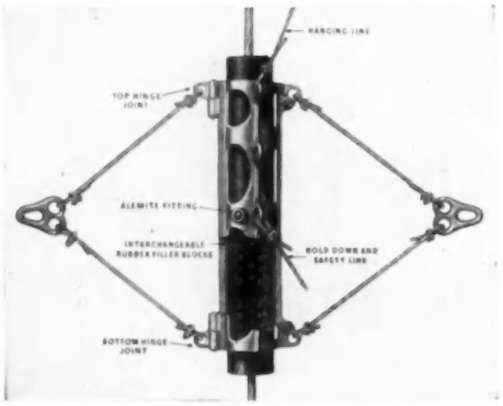

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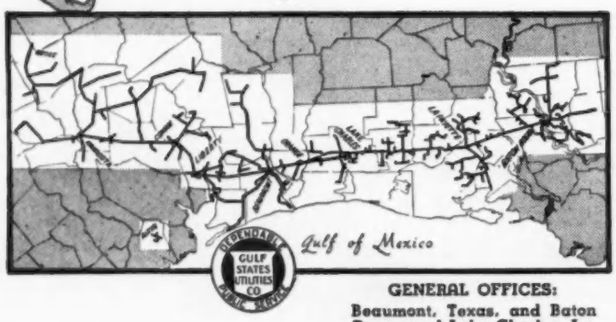


**GENERAL OFFICES:**
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these days of curtailed production. The important thing probably is going to be the best average performance for the well over a considerably extended productive life. The equilibrium of forces and volumes in these wells is going to change rather slowly as production proceeds; and, if the sand face around the well bore starts off with fluid saturations about the same as in the reservoir itself, the average performance of the well may be improved, by the original treatment or by treatment from time to time, before the condition of well and reservoir becomes too bad.

4. The problem of "water block" in the sand face probably can be overcome best by: first, good drilling-mud condition to prevent excessive filtration; and, second, treatment of the mud with surface-active agents that will allow water filtering into the sand to be expelled more quickly and uniformly by the flow of oil.

In cleaning out and working over producing wells, surface-active agents may be useful also in the water used to kill the well, or to wash it, so that any water forced into the sand by hydrostatic pressure will be discharged more quickly and uniformly by the reservoir fluid.

In conclusion, it seems worthwhile to say that our natural interest in the *surface tension* of interstitial and intruded water may not be altogether to the point. The number of dynes reduction in surface tension does not necessarily measure the value of a surface-active agent in an oil well. No exact method of testing is available, but it is likely that small amounts of surface-active agents selected for their effect on the *rate* of discharging water from porous sands will give better results than when the basis of treatment is simply to lower surface or interfacial tensions.

The field of surface forces, particularly as applied to improving the efficiency of oil recovery, barely has been touched. It will require much persistent cooperative effort to make real progress in this field. Appreciation should be expressed for the progressive interest of the operators who already have used surface-active chemicals in their wells. Early progress should be made if many more will participate in future development work.

Meanwhile, the writer welcomes any discussion of this subject, even though many of the answers may not be available until some future time. The writer also wishes to express his appreciation to those who have provided the information and stimulating discussion that has made it possible to present this progress report on this interesting subject.

## Bibliography


[1] M. C. Leverett, *Trans. Am. Inst. Mining Met. Engrs.* **132,** 149 (1939).
[2] Nico van Wingen, *Oil Weekly,* **91 [5]** 26 (1938).
[3] R. J. Schilthuis, *Trans. Am. Inst. Mining Met. Engrs.* **127,** 199 (1938).
[4] G. H. Fancher, J. A. Lewis, K. B. Barnes, *Penn State Coll. Mineral Ind. Exp. Sta. Bull. No. 12,* 65-167 (1933).
[5] A. D. Garrison, *Drilling and Production Practice,* American Petroleum Institute, New York, 130-40 (1935).
[6] P. D. Torrey, *Oil Weekly* **93 [11]** 26; **[12]** 36; **[13]** 40; **94 [1]** 17 (1939).
[7] P. J. Lehnhard and H. A. Reimers, *Oil Weekly* **94 [5]** 15 (1939).
[8] W. V. Vietti and A. D. Garrison, U. S. Patent No. 2,024,119.
[9] F. C. Benner, W. W. Riches, and F. E. Bartell, *Drilling and Production Practice,* 442 (1938).
[10] F. B. Plummer and H. K. Livingston, *Bull. Am. Assoc. Petroleum Geol.* **24 [12]** 2163-79 (1940).
[11] C. R. Caryl and W. P. Ericks, *Ind. Eng. Chem.* **31,** 44 (1939).
[12] C. R. Caryl, "Structure of Wetting-Agent Molecules," presented before joint meeting of the American Section of the Society of the Chemical Industry and the American Institute of Chemical Engineers, New York, Feb. 28 (1941).
[13] H. L. Cupples, *Soap* **15,** 30 (1939).
[14] C. A. Sluhan, *Paper Trade J.,* Aug. 22 (1940).

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**GRAY ROTARY FISHING TOOLS**—Release Spears, Releasing Overshots, Slip Sockets, Slip Socket Guides, Lip Pattern Guides, Rotary Shoe Guides, Milling Guides, Hill & Foster Guides, Taper Taps, Box Taps, Hooser Wall Hooks, Latch Jacks, Casing Perforators. (See pages 870-876)

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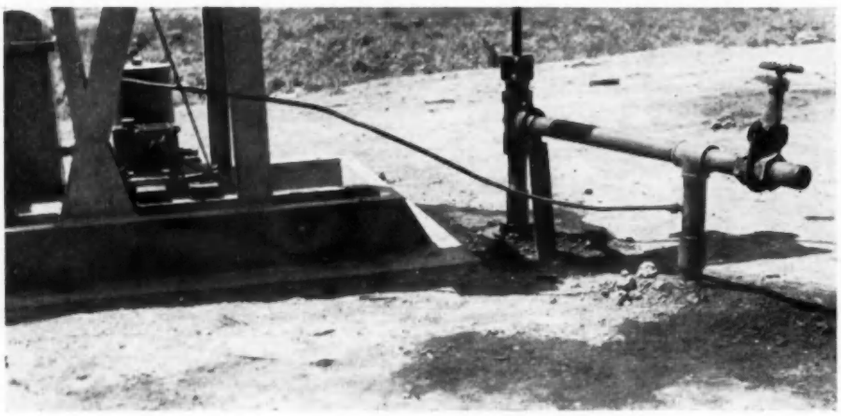
# Practical Operating Hints for

## 1. TREATING

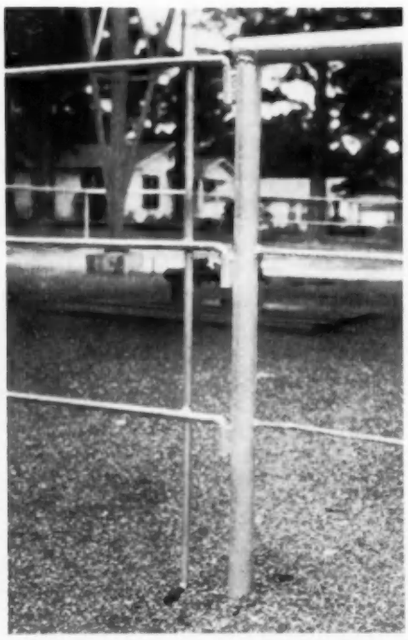
### Convenient Hookup Employs Lubricator Powered by Beam of Pumping Jack



**Crude is treated at this well by a lubricator operated by the pumping jack beam.**

PUMPING wells in the Heusler Dome pool in Posey County, Indiana, produce cut oil that is treated at the well with chemicals, fed into the lead line by lubricators operated by the beam of the jack. A slab of concrete is poured on one side of the well, flush with the ground surface to receive the channel iron base of the jack, gearbox and electric motor. At one side of the beam post, a platform is bolted to the channel iron foundation to support the chemical feeder and reserve chemical tank.

A long rod is connected to the lubricator actuating arm, running upward where it is fastened to the web of the beam with a connector that can be adjusted to control the stroke of the lubricator. A compression type nipple is attached to the lead line riser to which is connected the discharge tubing of the lubricator so the desired amount of chemical can enter into the stream of oil and travel with it to the lease tank battery.



**A section of this fence enclosing a pumping well may be removed readily.**

## 2. FENCING

### Removable Sections to Admit Equipment

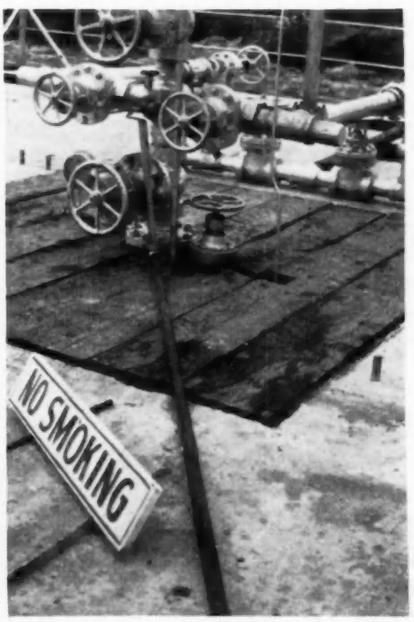
TO protect persons carelessly approaching pumping units of wells located in the vicinity of a company camp, one operator erected durable fences of welded steel pipe to enclose the area between the legs of the servicing derricks. To eliminate the fences as an obstruction when working on the well, each fence is equipped on two sides with removable sections 12 to 15 feet long which are taken away to facilitate hauling equipment and to provide an approach to the pumping units with work-over machines.

The removable sections, light in weight, are constructed of three horizontal sucker rods welded to uprights for support. At each end of the sections, the horizontal rods are turned down in a vertical position for hangers. Sockets welded in the proper position on uprights of the permanent fences support the hangers at both ends of the removable sections. By lifting vertically, the portable segments are removed from their supporting sockets and withdrawn to the desired distance from the derrick during work-over operations.

## 3. TREATING

### Pipe Protects Copper Chemical Line

WHEN chemicals are being injected into the oil flow line of a well producing with a flow-pressure of several hundred pounds, more than ordinary precautions must be exercised in care of the small copper tubing line used in conducting the fluid from the chemical pump to the flow line. If the line were to be inadvertantly broken or crushed, escaping oil




**This copper tubing carrying treating chemicals is protected by 1-inch pipe.**

might be sprayed over the derrick floor and fittings; or if the accident were not discovered for some time, the cutting off of the chemical might make it necessary to separately treat a tank of emulsified oil before it could be shipped.

One company has made it a practice to run the small copper tube through a length of regular 1-inch line pipe that is laid across the floor. An ell and riser also are used to bring the line up as close as possible to the flow line.

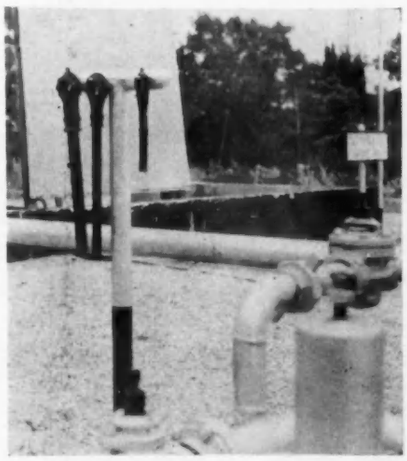
When work is to be done on the well, the entire line can be disconnected and removed to a safe distance from the scene of operations, with complete assurance that the small line will still be in perfect condition when it is reassembled.

### 4. TOOL CARE

## Convenient Rack for Valve Wrenches

AT LOCATIONS where control of the flow of oil and gas is controlled through lubricated plug valves equipped with removable wrenches, the wrenches can be concentrated at one point by using a post with a cross-arm having pins for hanging them at a convenient height.

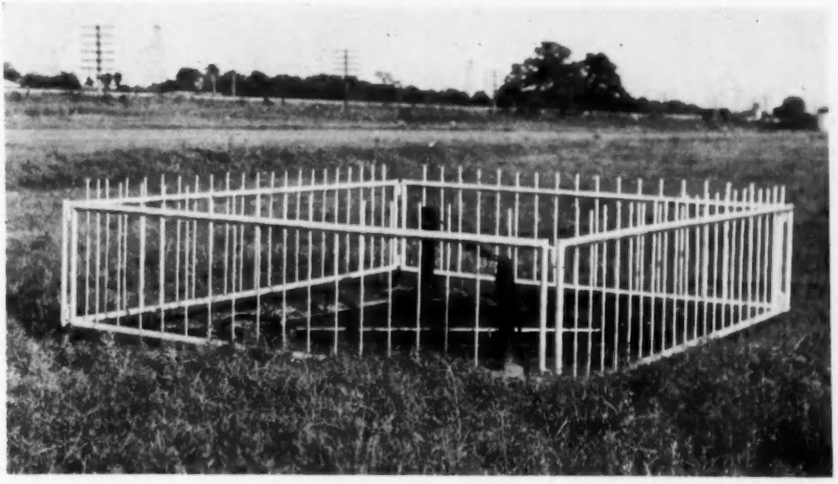
By providing such hangers, not only are "barked" shins eliminated, but each wrench, when not in use, is always on its respective pin, in plain sight ready for the pumper.



**Removable wrenches for lubricated plug valves are conveniently hooked on post.**

### 5. FENCING

## Sucker-Rod Material and Pipe Employed for Low Fence to Enclose Pumping Unit



**This fence protects animals and small children from contact with the pumping unit.**

PRODUCING leases not only can be operated at greater efficiencies by utilizing extra equipment around the warehouse but can be made to attract favorable attention from the motorist on the highway. On a lease of The Pure Oil Company, a swing pumping two shallow oil wells has been enclosed with a metal fence to protect straying animals and small children. This adds to the appearance of the lease as well as providing an economical safety feature.

The enclosure was made of sucker-rod material cut in 4-foot lengths, and 1½-inch pipe 15 feet long. A swing gate enables the pumper to inspect and service the equipment.

### 6. SERVICING

## Anchors Located to Serve Twin Wells

IN an area where twin-well drilling is used to produce from two different zones, one company finds it convenient and economical to set service unit guy line anchors in such positions that they will be able to serve either well on each side, or both together. A length of 6-inch drill pipe is buried in a deep-set concrete base. The pipe extends above the surface approximately 24 inches.

As closely as possible to the base of the exposed pipe, two loops of 1-inch steel shafting are conveniently spaced 90-degrees apart and welded into the pipe.

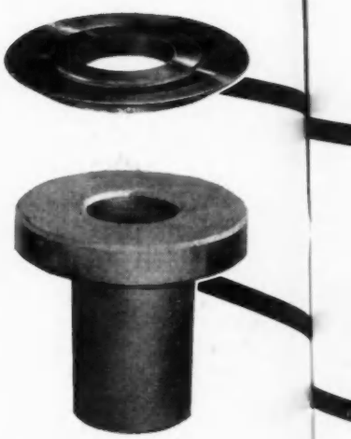
The wells were not equipped with derricks, pulling and servicing jobs being done with a portable mast-type unit.

**This service unit guy-line anchor is arranged and set to serve twin wells.**

# Let this pair Reduce your pump upkeep costs

## New Mission Compound-308 Valve Inserts

**These inserts last 3 to 5 times longer than regular inserts in ordinary mud** and up to 10 times longer than oil-resisting inserts formerly used in hot mud, treated mud or oil and gas. This exceptionally long life greatly reduces insert replacement costs.



## Mission Replaceable Valve Seat Bushings

These inexpensive bushings take the wear instead of the more expensive valve seat. Bushings are easily replaced and cost only a fraction of the cost of the entire seat. This means lower valve seat replacement costs in your pumps.



### GUARANTEE

**If a competitive test in your pumps does not prove that Mission Slush Pump Valves are far more economical to use than the valves you are now using, the entire purchase price of these valves will be promptly refunded.**

### Test these valves in your Pumps.

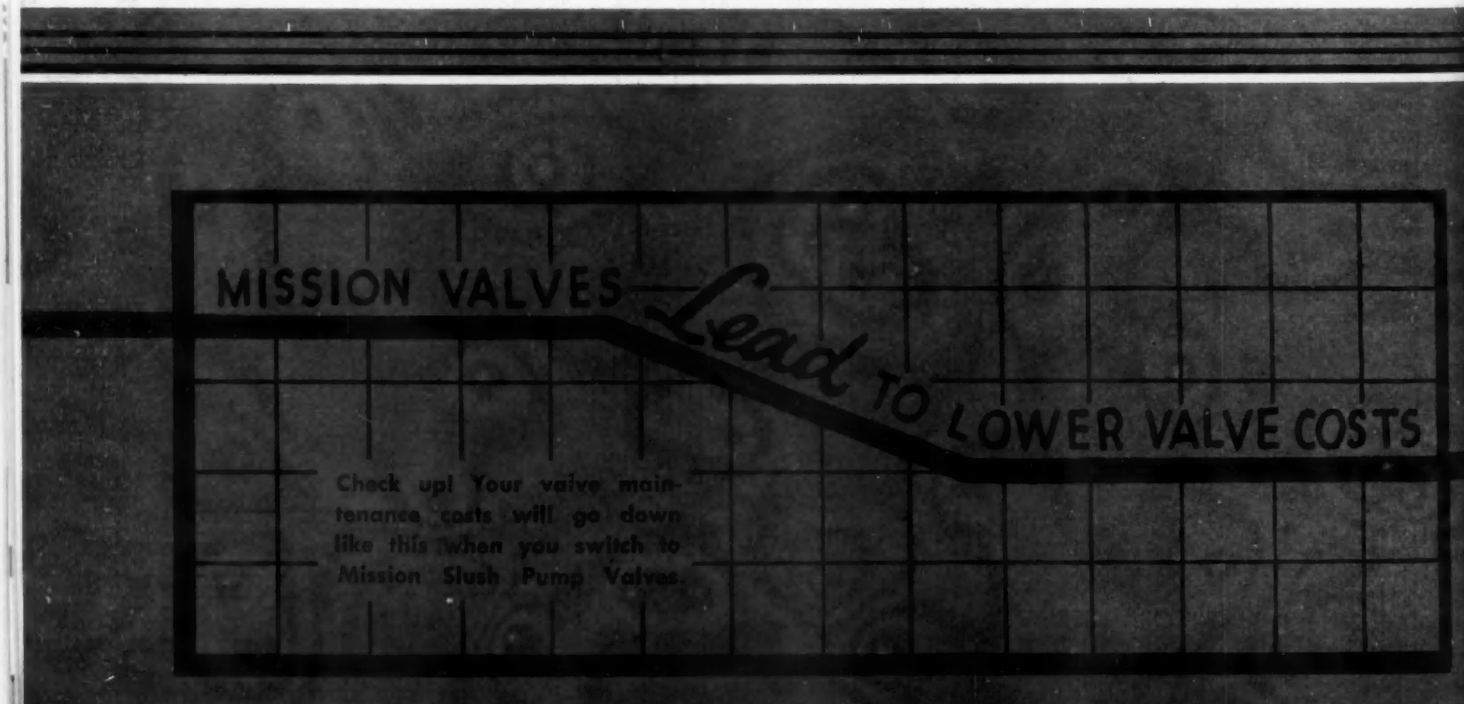
We know that when you make a cost comparison, you too will become a confirmed Mission user.

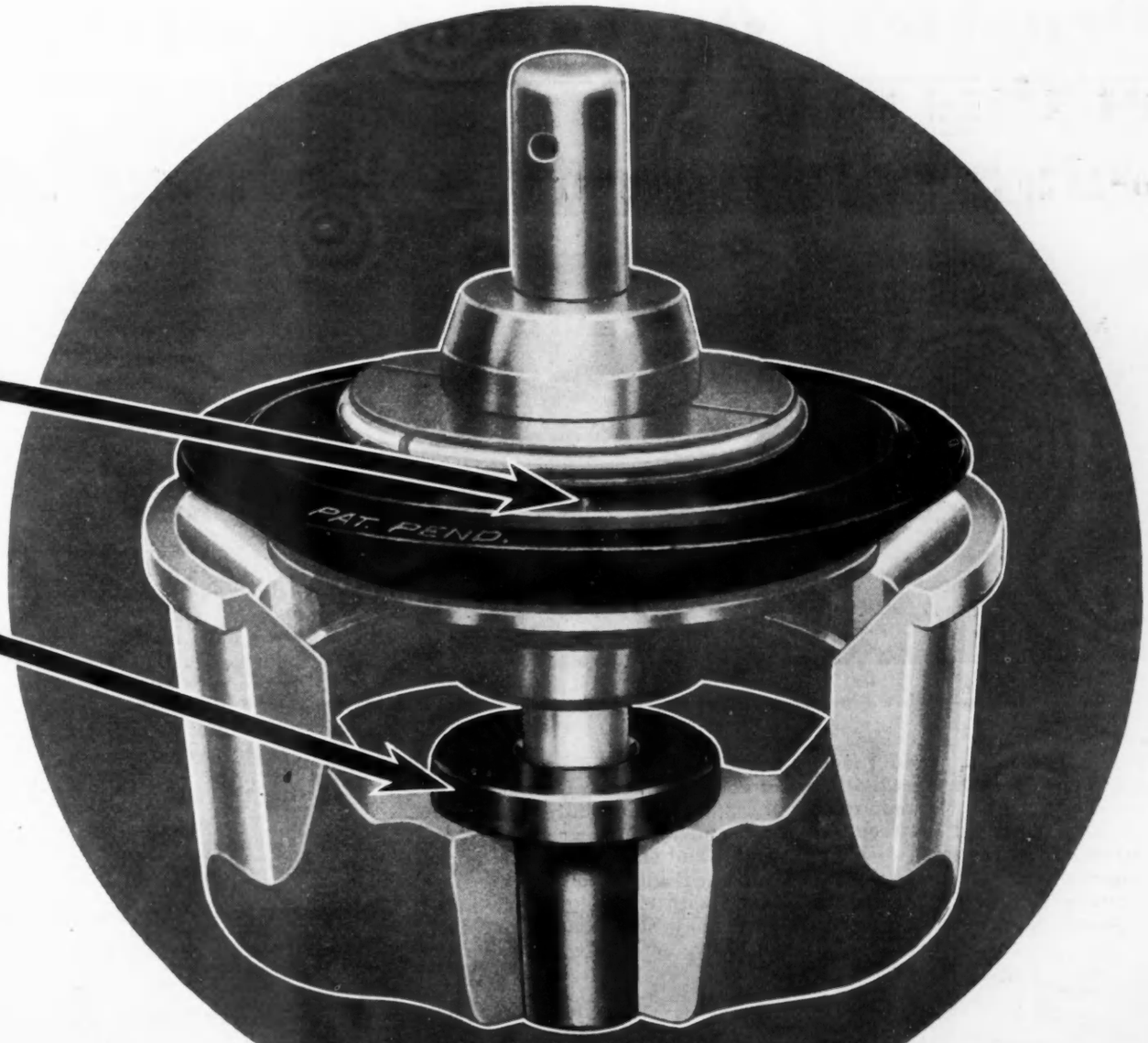
**Mission Manufacturing Co., Houston, Texas. Export Office, 30 Rockefeller Plaza, New York.**

**MISSION**

SLUSH PUMP PARTS

Your pumps stay running longer and cost less to repair when equipped with Mission Pump Parts


MISSION VALVES Lead TO LOWER VALVE COSTS
Check up! Your valve maintenance costs will go down like this when you switch to Mission Slush Pump Valves.




# SAVE MONEY!

## CHANGE BUSHINGS WHEN YOU CHANGE COMPOUND-308 INSERTS

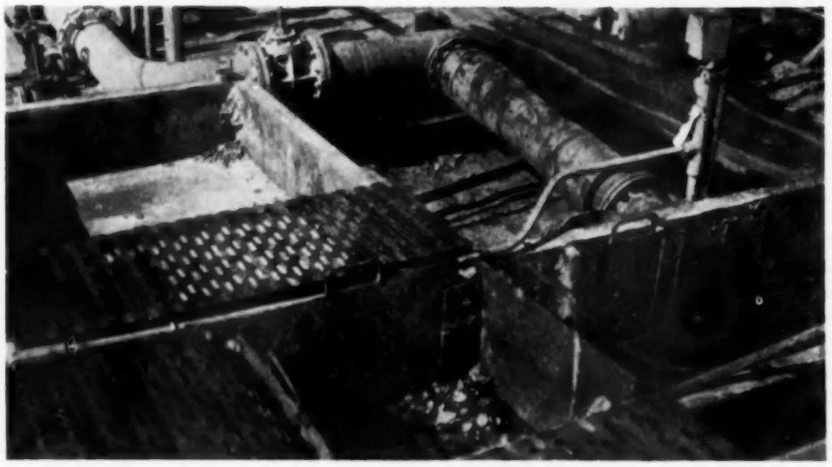
When it becomes necessary to renew Compound-308 Inserts, it is advisable to change bushings at the same time . . . because Compound-308 Inserts give such remarkable service that they last as long as steel bushings.

# *Practical Operating Hints for*

**THE practical operating hints for the drilling rig and production man, appearing in these features each week, are secured from oil fields everywhere and offer suggestions that will help to improve field efficiency and safety. The items give an excellent picture of the remarkable ingenuity being exercised by the operating divisions of the industry. Contributions to these features will be paid for at the rate of $5 for each illustrated item accepted. Address contributions to "The Editor, THE OIL WEEKLY, Houston."**

## 1. MUD HANDLING

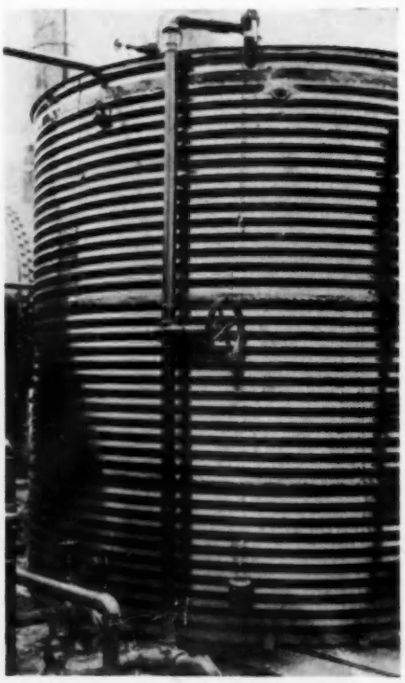
### Quick Change of Drilling Mud Effected by Manifold Between Well and Pits



**Ditch manifold between wells and pits provides means for quickly changing mud.**

ANTICIPATING need for facilities to quickly change mud when gas cut, one company standardizes on a ditch manifold between the well and the suction pits.

This equipment accompanies the unitized deep drilling tools used at Dominguez, and is made of steel throughout. The main ditch leads directly to the shale shakers and the suction pits, but between the well and the pits several diverting panels and slip gates are provided, furnished with hand bails and secured with chains to prevent loss. They may be operated quickly in an emergency for a quick change of mud.



**Water level in this tank is controlled by a valve actuated by a large float.**

## 2. WATER SUPPLY

### Float Provides Ready Check of Tank Level

CHECKING the level of a water tank used to supply the boiler feed-water pumps on boilers of a wildcat well was simplified materially by one boilerman.

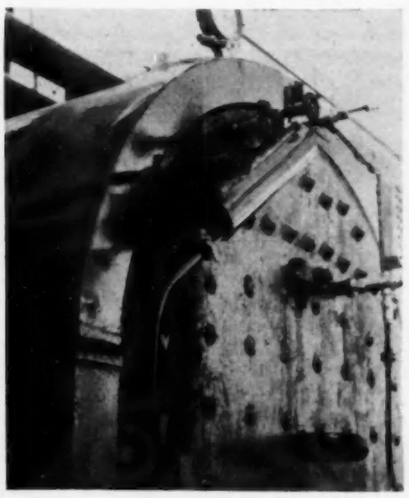
A 2-inch water line was installed to run up the side of the tank, with a gate-type valve in the center of the line. An engine throttle wheel was clamped to the hand wheel of the gate. A large float on the water in the tank was connected by a light wire line up over a pulley at the edge of the tank, wrapped twice around the throttle wheel rim, and then connected to a weight below. The weight was installed high enough so that it would not strike the ground when the tank float was at the top of the tank. As the tank filled or emptied, it progressively closed or opened the fresh-water valve, thus maintaining a fairly constant level.

Part of the packing in the stem of the gate was removed, and the remainder carefully repacked to allow the gate to operate as easily as possible with a minimum of leakage.

## 3. GOOD HOUSEKEEPING

### Drippings from Boiler Valves Collected

NEATNESS and safety at the firebox end of each boiler is facilitated by the boiler man of a California drilling company by equipping the boilers with three inspec-



**Drippings are conducted away from the boiler front by this trough and tube.**

tion test cocks as well as a visual water-level indicator.

To prevent alkaline and rusty water streaks from forming down the front of each boiler with use of the cocks, a small cylindrical drip collector was welded and hung below them by small brackets. A ¼-inch drain pipe conducts the water to the ground below the boiler.

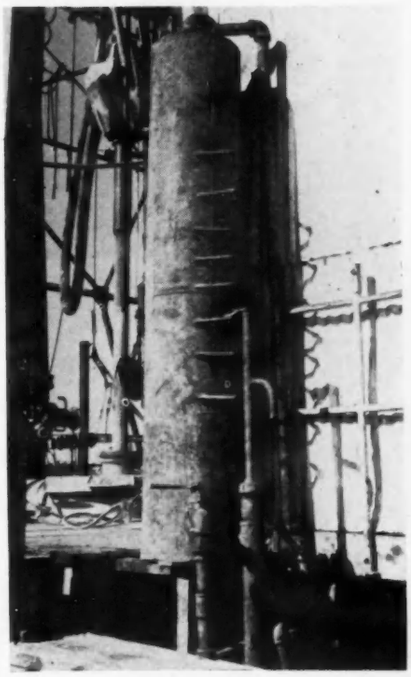
Aside from better appearance resulting from painting and strict maintenance of the fittings and surface of each boiler, the drip collectors take on added value at times when early detection of a potentially dangerous pin-hole leak, or strained rivet or bolt is made possible only by noting the small amount of water or staining that might accumulate at that point.

### 4. RIGGING UP

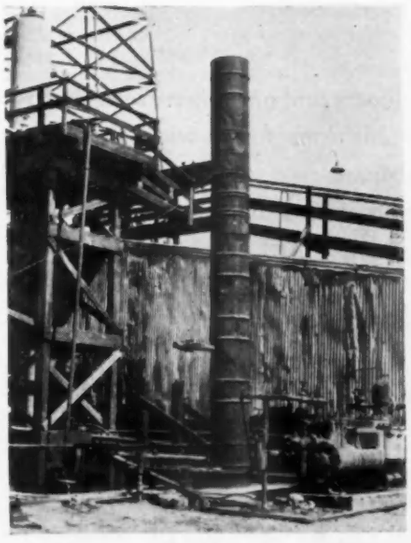
## Syphon Control for Brake Water Level

TO regulate the amount of water in reserve for the hydromatic brake on many of its drilling tools, Royalty Service Company installs a pipe reservoir at one side of the derrick floor which has an adjustable syphon to control the water level.

A connection is welded near the base of the reservoir to attach a 3-inch nipple carrying the fittings for a syphon well. The syphon is one-inch, sliding through a packing gland, with a hook at the upper end to connect to lugs welded to the case of the reservoir. As a greater water reserve is required than at the moment, the syphon is raised to the desired height and the water is automatically held at that level.



**Adjustable syphon on this hydromatic brake reservoir controls the water level.**



**Oil drums, with bottoms serving as baffles, make this exhaust muffler.**

### 5. RIGGING UP

## Oil Drums Provide Compact Exhaust

IN one of the more congested town-lot drilled sections of a California field, one operator built an efficient exhaust muffler for his steam shipping pumps and other steam-powered equipment.

Seven discarded drums were welded together to form a large-diameter stack. The top of each drum was cut out, but only large-diameter holes were cut out of the bottoms. When the drums were welded together, these perforated bottoms acted as baffles to the ascending exhaust steam entering through the bottom.

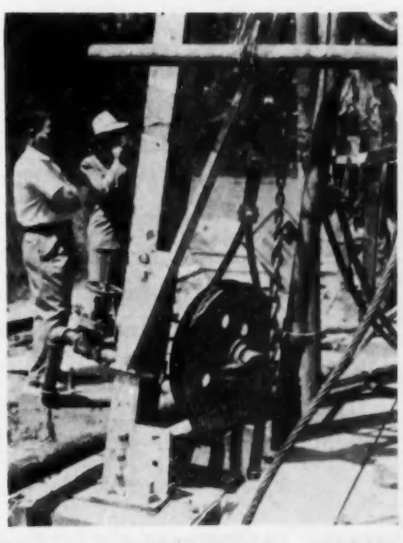
Water condensate from the cooling steam column quickly drops out and is removed through a drain at the bottom. During normal operations very little excessive noise can be heard, and due to the cooling or condensing action of the column, a comparatively small volume of steam actually escapes from the top of the muffler.

### 6. ROPE CARE

## Sheave for Deadline Protects Rope

TO AVOID kinking the deadline by severe bending where it is fastened to the derrick base, one operator uses the sheave from a crown block for an anchor. The deadline is spooled through the sheave and run through the eye fastened to the corner of the derrick for the connection. The sheave reverses the direction of the line, which is turned back and clamped above it.

The line is joined securely to the anchoring eye, but the grooved wheel relieves it of punishment from sharp edges and at the same time spreads the bight in the line to prevent an acute reversal of its direction. The deadline connection is an aid to rigging up and eliminates the necessity of frequently cutting off pieces of the line. This removes the danger of a line being kinked during operations, and reduces the hazard of using one weakened by previous bending.



**Sheave of a crown block is used as an anchor to avoid kinking the deadline.**

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# HIGHLIGHTS IN THE WEEK'S NEWS

## Washington

### *Cole Introduces Pipe Line Bill With President's Backing*

Legislation under which the government may construct pipe lines for transportation of petroleum or petroleum products, or may grant to private builders of such lines the right of eminent domain, as a measure of national defense, was introduced in Congress May 20 by Representative William P. Cole, Jr., as President Roosevelt urged immediate consideration of the bill to avoid the necessity of restricting consumption on the East Coast to essential uses within the next few months.

The president revealed the possibility of oil priorities in a letter to Speaker of the House Sam Rayburn, in which he explained that a copy of the bill had been submitted for his consideration by Cole, chairman of the House Interstate and Foreign Commerce subcommittee which recently investigated the southeastern pipe line situation, developed by the refusal of the Georgia railroads to permit two projected pipe lines to cross their rights-of-way.

"The measure is concerned with one of the vital phases of our national defense program," he asserted.

"The vast concentration of industry, population and military bases on the Atlantic Coast is now dependent for petroleum upon tankers plying between the Gulf Coast and the Middle Atlantic ports," he said. "Not only is this water route long and potentially perilous, but even present demands upon these transportation facilities make restriction of oil consumption to essential uses a distinct possibility within a few months. The immediate construction of pipe lines to augment the supply to the Atlantic Coast is the one means available to relieve this situation.

"The bill which is proposed by Mr. Cole seems to me adequate to accomplish its objectives, and, in my opinion, it is a measure of first rank in importance. The situation which the bill is designated to correct must be remedied. I therefore take this means to call the measure directly to your attention and to urge that it be given early and earnest consideration by the Congress."

Under the bill, the president would be given powers, to terminate on June 30, 1943, to declare the construction of pipe lines necessary for national defense purposes and, "if the President is of the opinion that such action is desirable in the interest of national defense he may provide for the construction, extension, or completion of any such pipe line by such department or agency of the government as he may designate."

In the event of lines constructed, extended or completed by private interests, they would be given authority to acquire such lands or rights-of-way of easements as might be necessary by purchase or by the exercise of the right of eminent domain by specific presidential order. Government agencies constructing lines would have similar rights, in both instances to be exercised by proceedings in the federal courts in the districts in which the lands are located.

The bill also makes provision for advances of federal funds for the construction of privately owned pipe lines, where necessary, and all pipe lines constructed under authority of the legislation shall be built, operated and maintained subject to such terms and conditions as the president may prescribe as necessary for national defense purposes.

No pipe line constructed under the bill is to be exempted from any controls which may be exercised under the Interstate Commerce Act or the Natural Gas Act, except insofar as the president may order as necessary for national defense.

#### Subcommittee Files Report

A lengthy report on the bill, signed by all members of the subcommittee, was filed with the house by Cole, together with a letter to the congressman from the president giving his approval to the measure.

"We assume it needs little, if any, argument to support the statement that if the Atlantic Coast area and the states in the southeastern part of the country require additional transportation facilities for the delivery of petroleum in quantities sufficient to meet the domestic and defense program needs, then congress should act and act expeditiously in passing any legislation required for such purposes," the subcommittee report declared. "Following the interesting inquiry into this subject with which we have been pretty closely identified in recent weeks, the subcommitee finds that such a need exists today and is becoming increasingly more pressing."

[*Continued on page 46*]

## News Index


**General:**

| | |
|---|---|
| Allowables | 39 |
| Associations | 41 |
| Courts | 40 |
| Legislation | 44 |
| Washington | 39 |
| **Markets-Statistics** | 47 |
| **Men in News** | 67 |
| **World-Wide Developments** | 49 |

**U. S. Field Operations:**

| | |
|---|---|
| Arkansas | 59 |
| California | 59 |
| Completions | 60 |
| East Texas | 55 |
| Illinois | 51 |
| Indiana | 51 |
| Iowa | 51 |
| Kansas | 52 |
| Louisiana Coast | 56 |
| Michigan | 59 |
| Mississippi | 59 |
| Nebraska | 51 |
| North Louisiana | 59 |
| North Texas | 53 |
| Oklahoma | 52 |
| Southwest Texas | 55 |
| Texas Gulf Coast | 56 |
| West Texas | 53 |
| Wildcat Development | 64 |


## Allowables

### *Tanker Situation Considered In June Bureau Estimate*

Anticipating a heavier demand than has been experienced in any month since April, 1940, the United States Bureau of Mines on May 21 placed the required output of crude oil for June at 3,830,000 barrels a day, an increase of 30,300 barrels over the estimate for May and 3 percent above actual production in June of last year.

The bureau's forecast of demand reflected the situation created by withdrawal of tankers from the Gulf-Atlantic trade for transport of British oil, the June quotas for Texas and Louisiana being cut 11,100 barrels below those for May in the face of the national increase of 30,300 barrels. Bureau officials explained that this reflected the lack of bottoms in which to transport oil to the East Coast.

The bureau found that daily average production of crude during the five weeks from April 5 to May 10 was 3,670,000 barrels, or 30,400 barrels above the average for March, while runs to stills were 3,713,000 barrels, with a decline in domestic stocks of 50,000 barrels a day, indicating a demand of 3,720,000 barrels.

"The problem of available tankers for the Gulf to East Coast movement may become a serious factor, particularly if combined with larger naval fuel-oil requirements and further increases in total domestic demand that will require a more complete use of refinery capacity," the bureau said in commenting on the general situation. "Gasoline on hand in the East Coast district on April 30, 1941, amounted to about 21,300,000 barrels, which is 900,000 barrels less than in 1939, the lowest of the three preceding years, while gasoline stocks in the Texas Gulf Coast district amounted to 16,500,000 barrels, or 3,500,000 barrels higher than those in 1939.

"Current conditions indicate increasing refinery operations in the Indiana-Illinois, Appalachian and Mid-Continent refinery districts. To the extent that larger crude oil requirements are met within this area, reductions in accumulated storage will be necessary to supplement current production in such

**Bureau of Mines Forecast of Crude Oil Demand for June**

| State | Forecast June, 1941 | Forecast May, 1941 |
|---|---|---|
| Texas | 1,371,700 | 1,382,200 |
| California | 615,300 | 598,100 |
| Oklahoma | 459,700 | 440,000 |
| Illionois | 345,300 | 336,100 |
| Louisiana | 319,700 | 320,300 |
| Kansas | 220,400 | 213,900 |
| New Mexico | 113,000 | 113,900 |
| Wyoming | 89,300 | 90,900 |
| Arkansas | 83,000 | 83,900 |
| Pennsylvania | 48,000 | 49,100 |
| Michigan | 38,000 | 40,000 |
| Mississippi | 23,300 | 22,900 |
| Indiana | 22,000 | 23,900 |
| Montana | 19,700 | 21,300 |
| Kentucky | 16,300 | 17,100 |
| New York | 14,000 | 14,000 |
| West Virginia | 11,000 | 11,100 |
| Ohio | 11,000 | 11,000 |
| Colorado | 5,000 | 5,200 |
| Nebraska | 4,300 | 4,800 |
| | 3,830,000 | 3,799,700 |

states as Oklahoma and Illinois. Ultimately, pipe-line movements of crude from more distant sources will be stimulated.

"In view of the strong domestic demand for motor fuel and probable further substantial increases in fuel-oil requirements," it was concluded, "the Bureau of Mines estimates that refinery runs should be at a high level and that no abnormal reductions of storage are desirable."

Domestic demand for motor fuel for the coming month is estimated at 59,900,000 barrels, an increase of 8 percent over the abnormally high actual demand in June, 1940, but an increase of almost 11 percent over the bureau's estimated normal for that month.

The report estimated motor fuel exports, on the basis of exporters' forecasts, at 1,700,000 barrels, exclusive of re-exports of motor fuel imported in bond.

Stocks of finished and unfinished gasoline totaled 98,922,000 barrels on March 31, while statistics of the American Petroleum Institute indicate that gasoline inventories declined about 3,000,000 barrels during April, which would leave approximately 96,000,000 barrels in storage at the close of last month. This is 7,500,000 barrels less than the stocks on April 30, 1940, and the bureau estimated a further decrease of 5,200,000 barrels during June.

Benzol production and direct sales of natural gasoline are estimated at 1,600,000 barrels, making an indicated refinery production of 54,800,000 barrels, which the bureau allocates among the several refining districts as follows: East Coast, 6,780,000 barrels; Applachian, 2,110,000 barrels; Indiana-Illinois, 12,120,000 barrels; Oklahoma, 2,630,000 barrels; Kansas-Missouri, 3,050,000 barrels; Inland Texas, 3,500,000 barrels; Texas Gulf Coast, 13,500,000 barrels; Louisiana Gulf Coast, 1,610,000 barrels; Inland Louisiana-Arkansas, 1,030,000 barrels; Rocky Mountain, 1,490,000 barrels, and California, 6,980,000 barrels.

The forecast places natural gasoline to be blended at refineries at 5.85 percent of the total refinery production, or 3,210,000 barrels, and the yield of straight-run and cracked gasoline is estimated at 44.9 percent which, applied to the production of 51,590,000 barrels, gives crude runs of 114,900,000 barrels, or 3,830,000 barrels a day.

The estimate for foreign crude runs to stills is 3,900,000 barrels; exports are placed at 2,500,000 barrels, compared with actual exports of 5,692,000 barrels in June, 1940, and crude oil to be used as fuel and losses is estimated as 1,400,000 barrels.

The estimates for exports and fuel and losses, it was pointed out, offset the estimate for foreign crude runs, making the estimated demand for crude oil identical with the estimate for runs—114,900,000 barrels, or 3,830,000 barrels a day, allocated among the producing states as shown in an accompanying table.

## *Continental Suit Is Discussion Topic at Texas Hearing*

A state-wide proration hearing held in Austin last week developed no new issues, but featured a discussion of effects of a suit brought by Continental Oil Company, the decision in which was handed down at the same time the Texas Railroad Commission hearing opened.

Commissioner Sadler described it as the most important decision affecting proration yet handed down by the courts. It gives Continental Oil Company the right to produce more oil than is allocated in an order fixed by the commission for the Conoco Driscoll field. The court refused to fix the allowable at a figure other than that which the commission had permitted to be produced in January, an allowance which the commission admitted could be produced without physical waste.

"Proration has failed," Sadler declared, "if this ruling is sustained in the higher courts. An operator may produce as much as he likes from any field, if it can be produced without physical waste, under provisions of this ruling.

"Some of the major companies, which have in the past attempted to be fair with independents, will not purchase their production in those fields where they produce the oil. I don't blame them for that."

Sadler pointed out that it was a problem for the operators, and not the commission, and urged them to support a bill pending in the Texas legislature to permit the commission to continue prorating Texas fields on the basis of a formula put into effect on March 10.

Total nominations filed by purchasers called for 1,805,428 barrels of oil for June, 33,105 barrels higher than May nominations. Sadler declared that if the court ruling is sustained, the allowable would have to be fixed at the total of nominations.

There were several requests for increases in particular fields, and most operators seemed to be pretty well satisfied with the allowances they get now. One group at Hawkins asked for an increase that would give them parity with Sulphur Bluff and Talco. Representatives from the latter fields asked for higher allowances to supply road oil and asphalt.

The Ohio Oil Company asked that Yates crude be classified as low-cold-test, so that it would receive an allowable in proportion to that assigned fields producing this grade of oil on the Gulf Coast. The company presented analyses of Yates oil purporting to show that it was a low-cold-test crude, but the commission asked for additional information in order that the tests could be compared exactly with those made on Gulf Coast crudes placed in this class.

Cosden Petroleum Company requested that the Howard-Glasscock allowable be raised 3000 barrels to supply the company's refinery at Big Spring. Some oil was to be taken from the Sharon Ridge field, but this would go to the Col-Tex Refining Company.

Sinclair Prairie Oil & Gas Company renewed a request for higher allowances to North Texas fields where it has pipeline connections. Company representatives asserted that there is a materially increased demand for crude from the entire state because of the break-down of sources of supply to England.

An increase for the Panhandle was requested by Phillips Petroleum Company. There is a demand for 87,425 barrels daily, and the net allowance now is 76,422 barrels. The company is withdrawing oil from storage in the area, according to evidence presented at the hearing. Danciger Oil & Refineries, Inc., also is short of oil in the Panhandle, and reported that The Texas Company was taking back some of the connections which Danciger Oil & Refineries, Inc., had held since 1939.

# Courts

## *Meet Again in Effort to Settle Anti-Trust Suit*

Attorneys for oil companies involved in an anti-trust suit now pending in the District of Columbia Federal Court met last week with officials of the Department of Justice for further exploration of the possibilities of a consent decree settlement, but reportedly made no progress.

Department officials indicated there was little prospect of any immediate agreement unless the companies were willing to abandon some of the points for which they are fighting.

The meeting was the first to be held over a considerable period, it was said. Pervious conferences had shown the government and the companies to be far apart in their views on what would constitute an acceptable decree.

Meanwhile, the respondents in the case have been given an extension of time to July 1 in which to file their answers to the government's bill of complaint, and there is little prospect that the case would reach trial before very late in the year. Accordingly, it was pointed out, there still remains considerable time for negotiation of a settlement.

There were rumors in Washington that, rather than engage in any prolonged litigation during the present emergency, the Department of Justice might sidetrack the case if an agreement could not be reached in the near future.

The oil industry has strongly supported the administration's defense program and has cooperated in every way possible with Washington officials in meeting the requirements of the Army and Navy for special as well as regular products.

Representations are said to have been made to department officials that to drag the industry into court for an indefinite period, with the outcome equally indefinite, might create so much disturbance as to react against the defense program at a time when all the resources of the oil industry are likely to be called upon.

## *Texas Proration Formula Upset by Continental Decision*

Continental Oil Company last week was granted a permanent injunction in 126th District Court against enforcement of the current Texas Railroad Commission proration order in the Conoco Driscoll field, Duval County.

The suit was brought against the commission, the company alleging that formula, made effective March 10, took from the company the right to sell from the Conoco Driscoll field the oil for which it had a market and could produce without physical waste.

The company will be permitted to produce under the commission's order for January, which allowed 3280 barrels gross, or 2115 barrels net after shutdown deductions. The order attacked permitted production of only 2024 barrels gross, or 1436 barrels daily net.

At a state-wide hearing last week, members of the commission declared that loss of this suit would disrupt proration unless a bill now pending in the Texas senate becomes law.

# Phillips Tells API Washington's Ill-Advised Regulation Cause of Transportation Muddle

PRIVATE enterprise is solely responsible for the development of the oil industry in the United States and for government to interfere with this setup would be fatal, governors of two prominent oil producing states told the one general session held at the Eleventh Mid-Year Meeting of the American Petroleum Institute in Tulsa, May 12.

Responsibility for the threatened bottleneck in transportation of oil from the Gulf Coast producing centers to Eastern United States refining and consuming centers was classed as "due to ill advised regulations in Washington" by Leon C. Phillips, Governor of Oklahoma. Through no fault of the industry, its normal domestic distribution system is being interrupted by government transfer of 25 tankers to routes that will assist movement to Britain, he continued. These references were not a part of his prepared speech, which was largely a tribute to the industry as an example of development through private enterprise.

### Ratner Praises Enterprise

Governor Payne H. Ratner of Kansas likewise classed the industry as having so developed its resources through private enterprise that it is now the outstanding example of an industry that is prepared to do its parts in national defense.

Both governors expressed the opinion that the industry will solve the problem of transportation of crude oil from Gulf Coast ports to the Atlantic Seaboard through methods proven by private enterprise.

The attitude of the Oklahoma governor was thus stated:

"I offer no apology for my friendship to this industry which means so much to my state. In fact, I am an unashamed friend of all honest business and industry. I do not believe that all business is sin and all businessmen sinners. On the contrary, I believe that free enterprise, labor and industry should be encouraged to insure the future welfare and prosperity of the state and nation. That has been my program."

After recounting the progress of the industry in conservation and the development of reserves, governor Ratner said:

"Private enterprise, not governmental activity, made the oil industry great. You and your fathers and your grandfathers, the men connected with oil since the first prospecting days, have been responsible for the development."

### Federal Control in Background

He said the attitude of the Cole committee toward federal control should be accepted as evidence that the industry and state regulatory bodies have done excellent work and added:

"The threat of federal control seems to be in the background now but there can be no assurance that it will not come forward again, perhaps in the name of national defense. Upon the fertile soil of American concern over European developments those favoring federal domination may try to sow the seeds of doubt that the oil industry can meet the emergency demands of defense.

"Government, at best, is a poor substitute for individual effort. Government is too huge, too widespread, for speed. Its ramifications are too vast for that close attention to detail which is vital to the success of any business. It is hedged by restrictions and tied down by red tape.

"Countries such as France that experimented in governmental control of industry grew rotten at the core, and crumbled swiftly when Germany invaded. The industrial defense of France might have been successful in the hands of private enterprise; it was a tragic failure in the hands of government.

"But what of oil? Is this an exceptional industry that does require governmental regulation? Proper and helpful regulation—yes. Stifling and dictatorial regimentation—no. The industry wants and needs cooperation with government, but there must be no control that will point toward the surrender of the American way of private enterprise."

## *Production Division Committees to Stress Reservoir Conditions in New Study Program*

THE program of the Eleventh Mid-Year meeting of American Petroleum Institute featured nine production papers that stressed the more technical phases of crude oil production. Committees and sub-committees met concurrently with general sessions to consider and to report upon specific problems. New topics were here assigned for investigation, these concerning virtually every phase of oil production but tending toward a more detailed analysis of reservoir conditions. Core analysis, logging, interpretation of subsurface information and kindred subjects are to be studied.

The scope of delivered papers included roller-chain fatigue effect, surface-tension-reduction agents, mud flow in drilling, depth-pressure data in potential determinations, core data and interpretative functions, and use of gravels in wells. Considerable detail was evident in these investigations, with their delivery expressing the outcome of months of investigation and research in the subjects treated. Technical detail and reference to prior investigation broadened the applicability of the papers to make them of more than ordinary value.

Practical means of using the data offered in the papers was suggested in sessions, and further avenues of research suggested. Cooperative investigation proved of definite value in some of the papers which presented the combined findings of more than one investigating body. Not only were the results of recent tests and findings expressed in detail, but they were detailed in relation to present field practice or to past work by the same groups of investigators. Emphasis was placed upon the actual use of the data presented, and upon its interpretation under field operating conditions. This, it was pointed out, increased not only the value of the work and findings to the many operators but would also broaden general acceptance of new data and would in many cases add to the information so far available through additional application in the field.

Abstracts of the production papers follow:

### Fatigue Effects in Roller Chain

BY ARTHUR E. FOCKE and WOODWARD A. WARRICK, *Diamond Chain & Manufacturing Company*

Observed characteristics of chain failures having proved that the breaks were produced through fatigue, a research program was inaugurated in 1930 to determine and improve the fatigue resistance of roller chains—this to be predicated on comprehensive laboratory work and to be confirmed by extensive field testing.

A. E. Focke

Laboratory program went on a 24-hour production basis in 1936, and in 1940 the efficiency of equipment utilization was 85 percent. Laboratory work alone represents more than 120,000 specimen-hours, which covers in excess of 4,000,000,000 stress cycles, and field work is of comparable scope.

A fatigue fracture may be defined as one caused by repeated application of a range of stress that is not great enough to cause failure when applied only once. Early exploratory tests disclosed failures duplicated the position and character of the link-plate breaks which had occurred on the rig-front chains.

W. A. Warrick

Axial tension fatigue tests at University of Illinois established that company method of testing gave results consistent with the rotating-beam test, even though the latter subjects the specimen to alternating tension and compression and a chain cannot be put in compression. A battery of six axial fatigue testing units are testing small

chains, ½-inch pitch, while large chains are tested to 70,000-pound maximum stress.

On 1½-inch pitch chain, an ultimate strength of 3700 pounds was proven on a curve. A single application of this load fractures the chain. As the test load is decreased, the number of cycles of loading to cause failure increases rapidly and at an accelerating rate. The curve becomes practically horizontal at 10,000,000,000 cycles (580 pounds), substantiating the fact that at this number of cycles the load actually has reached the endurance limit, and that further applications of such a load will not cause fracture.

Preliminary tests to explore the effects of increased link-plate thickness confirm field experience that the surplus link-plate capabilities of extra-heavy chains result in higher endurance limits than those of heavy chains of similar dimensions as to pitch, roller diameter, pin diameter, etc. The higher endurance limit and link-plate thickness are not necessarily directly proportional, and tests and experience show that there is a limit beyond which additional link-plate thickness is uneconomic.

Laboratory data indicates that the endurance limit of multiple chain is proportional to that of a single chain. Although invaluable information is yielded by determinations of polished-rod loading, mathematical evaluation of individual factors affecting chain loading—the effect of the angularity of crank and pitman, the type and amount of counterweighting, relative masses, bottom-hole pressure, harmonic vibration, speeds, etc.—is largely a matter of personal opinion. Actual peak loads on pumping chains can be measured by means of special links assembled into the chain.

Although present tests have covered a wide range of link-plate steels and heat treatments, and have resulted in significant betterment of endurance limit to the extent of warranting the assumption that in the present state of the art the ideal link-plate analysis and heat treatment are closely approached, it is increasingly evident that a tremendous volume of fatigue investigation remains to be accomplished because performance can be predicated neither on basis of available literature nor from usual information developed from static tests.

Immediate investigations are concerned with effects on endurance limit of the mechanical processes by which chains may be made.

### Casing Window Practices in the Illinois Basin

By C. G. Herrington,
*The Carter Oil Company*

The practice of cutting oil-well casing as developed in Illinois, and particularly applied in Louden field, on the west edge of the basin, is allowing production from multiple oil sands. Not only can oil be produced from a well so equipped by flowing, but crude can be produced by pumping simultaneously from several different oil zones.

**C. G. Herrington**

In a particular case, three pay zones of tightly compacted sand bodies, separated by shale strata from 5 to 150 feet thick, are found productive. Each of the pay formations is shot with nitroglycerine. Drillable casing allows the operator to obtain open hole at the desired depth. The casing is cut with special mills, is shot out, or is opened with wall scrapers.

Of primary importance in assembling a casing string incorporating drillable pipe is a special, heavy casing shoe to be used at each end of the section to be drilled through. These shoes are equipped with female ends to receive the special section, and are of value in protecting the exposed end of the steel pipe during shooting operations.

A total of 489 drillable sections has been installed by more than 60 different operators in 28 of Illinois Basin fields since January, 1941. Many others had previously been used. So far this year, there have been no casing failures attributed to the use of alloy sections. The cost of a typical 25-foot section is about $950 for installing and scraping, and less for installing and subsequent removal with nitroglycerine.

### The Use of Depth-Pressure Data in Determination of Well Potentials in California

By Richard W. French,
*Continental Oil Company*
Malcolm W. Morris,
*Standard Oil Company of California*
Everett G. Trostel,
*Union Oil Company of California*
and
John C. Young,
*Office of Oil Administrator, Conservation Committee of California Oil Producers*

Voluntary curtailment in California, made possible through mutual cooperation of producers, brought about allocation problems similar to those confronting the usual regulatory bodies. Individual well potentials, at first set solely by demonstrative tests, have been supplemented by subsurface-pressure measurements to determine a well's productivity. Rules and regulations governing the procedure have been promulgated by the depth-pressure advisory committee, which committee also advises the oil administrator in the interpretation of these rules. The method for applying subsurface pressures to potential determination is based on the measurement of producing pressures in the well bore opposite the producing horizon, together with corresponding rates of production.

In the application of the principle, specific rules required for flowing and gas-lift wells were necessarily changed in pattern so that they were also applicable to pumping wells. Identical rules apply to wells which flow or are produced by continuous circulation of gas. Wells produced intermittently by gas lift are not included in the method.

For a flowing or gas-lift well, it is necessary that at least three points be established on a pressure-rate curve. This curve is characteristic of each well, and expresses the performance of its effective reservoir drainage area and constitutes the reference

**R. W. French**

**M. W. Morris**

**E. G. Trostel**

**J. C. Young**

for the productivity index. If the well is tested at three rates of flow, the low rate must not exceed one-third the high rate, and the intermediate rate should be as near an average of the low and the high as it is practical to obtain. A static measurement may be used as one point of the three curve references.

The potential may be determined algebraically or graphically. By the former method, the productivity index of the well is multiplied by the available pressure; the difference between the static and the minimum mean producing pressure, which in turn is 30 pounds per square inch plus the vertical-flow pressure loss at the highest test rate, to obtain the potential.

Pressure measurements in pumping wells are made either with a depth-pressure recorder placed below the pump, or by means of sonic measurement of the fluid level in the annular space between tubing and casing. Two points are required, either two producing or one static and one producing.

Calculation of a potential is derived by extending the pressure-rate curve to its value at the minimum mean producing pressure. This pressure is determined by assuming the fluid level to be drawn down to the top of the perforations or the pump shoe, which ever is the deeper.

### Mud Flow in Drilling

By R. J. S. Pigott,
*Gulf Research & Development Company*

Properties required of muds for lifting cuttings, suspending them when circulation is stopped and dropping them in the mud pits, frequently are opposed, and compromise properties giving the best average results must be selected. Tests were taken on 4-, 1- and ½-inch pipe and capillary tubes. A modified McMichael absolute viscosimeter was used to demonstrate that flow of mud can be predicted in viscous region by utilizing the variable apparent viscosity in place of the usual constant viscosity for a liquid.

**R. J. S. Pigott**

In the turbulent region of flow all plastic effects and, consequently, variation of viscosity disappear; then mud can be treated as a true liquid. Experiments show that in this region the viscosity of mud is surprisingly low.

Part of the hole and generally all of the mud pit, are in viscous flow; the remainder of the system is largely in turbulent flow. As the behavior of cuttings follows different laws in these two regions, it is necessary to take both conditions into account in determining flow conditions.

For flat particles such as shale, cut stone, etc., the required velocity is lowered

as the cutting tends to be carried up in the position of greatest resistance to flow past it, broadside to the flow. Contrary to general belief, streamlined bodies fall broadwise in a vertical stream.

General conclusions are that pressure drop and sustaining effect of any mud can be computed provided the complete viscosity-velocity relations and the density of mud first have been determined. Raising velocity and density is most useful for lifting. High viscosity either in the viscous or turbulent region is undesirable, as it raises pump pressure in all cases, if in the viscous region is a serious obstacle to dropping cuttings. Gelling to sustain cuttings when circulation is stopped should be obtained by the use of high-gelling materials which, when in motion, do not add materially to the viscosity.

### The Permeability of Porous Media to Liquids and Gases

By L. J. Klinkenberg,
*Shell Development Company*

The standard procedure for determining permeability of porous media according to API Code 27 is based on the fundamental assumption that, as long as the rate of flow is proportional to the pressure gradient, the permeability constant of a porous medium is a property of the medium, and is independent of the fluid used in its determination.

**L. J. Klinkenberg**

Although this is true for most liquids, the permeability constant as determined with gases is dependent upon the nature of the gas, and is approximately a linear function of the reciprocal mean pressure. This effect can be explained by taking into account the phenomena of slip, which are related closely to the mean free paths of the gas molecules.

The apparent permeability extrapolated to infinite pressure gives a permeability constant which is a characteristic of the porous medium only.

A careful survey of literature leads to the conclusion that for flow through capillaries there is no evidence for the presence of absorption layers of such a thickness as to decrease perceptibly the liquid permeability of a porous medium. In order to test this experimentally for porous media and to avoid complications by swelling or erosion of such material, permeability measurements were carried out on Jena glass filters.

In determination of the permeability to liquids the following points require attention: (1) suspended and colloidal contaminations in particular may clog the sample and thus cause a reduction in permeability; (2) during the determinations all pores should be saturated completely with liquid. Gas bubbles, if occluded in the pores, would cause the permeability of the sample to be too low.

Two types of apparatus were required, one for determining pressures below and one for determining pressures above atmosphere. Permeability apparatus for low pressures consisted wholly of glass in order to prevent possible errors due to gas liberated by rubber connections. Equipment consisted of manometers, flow meter, drying tube, levelling vessel, manostat, drying tower, oil pump, high vacuum and glass tubing.

Permeability apparatus for high pressures for gases consist of a metal cylinder with gauges, air buffer, six-volt battery for electro-magnetic wave, electric manostat, relay, graduated pipette, precision manometers and tubing.

### Core-Analysis Interpretation

By Norris Johnston,
*General Petroleum Corporation*

Core analysis has reached a stage of development in which it is one of the most valuable tools available for study of reservoir and reservoir conditions. In such study, there are a number of factors to be determined and applied to the case in question.

**Norris Johnston**

The first of these is porosity, defined as that portion of the reservoir formation available for oil and gas or water; or, in other words, that portion of the bulk volume of the reservoir rock not occupied by the rock material of the reservoir. While most of the porosity is connected from pore space to pore space, there is some that is not connected. This latter is known as "isolated porosity," and the former as "effective porosity," each term implying the condition.

Permeability of a formation is a measure of the reservoir's ability to transmit fluid. Naturally, only the effective pores will be able to carry moving fluids or gases, and this carrying capacity will be in a relation dependent upon diameter of each pore, diameter of connecting vents, channels and upon the type of fluid transmitted.

Saturation is a rating of the fluid contained within the reservoir body, and is usually referred to as a volume percent of the pore space. In testing for saturation as well as the other factors involved in core work and analysis, it is essential that the core obtained be as nearly representative of the actual subsurface conditions of the reservoir as is possible. Toward this end, three special core barrels have been developed. Related tests of the formation are made to determine the character of the sand grains making up the formation, and to calculate the chemical composition of any formation waters.

Data obtained from core analysis can be applied directly or by formula to a number of problems. The most apparent of these is for identification of the sand body penetrated. Probable productivity of the sand can be calculated, and oil-water ratios judged. A productivity index can be established by formula. Fluid content of the sand body can be defined, gross oil volumes can be accurately determined, water drive influences can be projected and curves drawn.

While many problems can be accurately or practically solved through core analysis, including reserve estimation and selection of completion zones, there are apparent weaknesses yet to be overcome. These are not serious, but do constitute a challenge toward even more exact analysis and interpretation.

### Pressure Core Analysis

By J. J. Mullane,
*The Carter Oil Company*

The pressure core barrel takes a core essentially in the same manner as a conventional core barrel, but upon completion of the drilling operation, the core barrel is sealed by means of valves, and the core and its fluid contents are brought to the surface under a pressure almost equal to the hydrostatic head of the drilling mud at the coring depth.

The following quantities are measured in the laboratory: porosity, permeability, residual oil saturation, residual water saturation, residual salt content of rock as sodium chloride, oil content of drilling mud from core barrel, salt content of drilling mud from core barrel, salt content of drilling mud from circulating system and lump density of dry rock.

In some cases a water-soluble tracer, dextrose, was added to the drilling mud to demonstrate the presence of water from drilling mud in the core and to estimate the amount of such water.

Reliable gas-oil-ratio data have been obtained from pressure cores. This data can be considered as an index of the energy available in the oil for production. It is immediately known whether a formation cored is alive, or whether it merely contains dead oil or oil under very low pressure. It has been found that gas reservoirs can be cored successfully, enabling important data to be obtained in a distillate reservoir.

Residual oil saturation in cores taken from distillate wells will average about 2 percent of pore volume, whereas with a conventional core barrel the major portion of hydrocarbon content of the core is irretrievably lost.

With the pressure core barrel it is possible to obtain an overall index of the properties of a well through the medium of gas data and volume of oil produced from the core when the pressure in the barrel is relieved. The detailed sample analysis then can be used as auxiliary data to aid in making a good estimate of the properties of the formation.

Observations made on tracer experiments and on salt content of drilling mud in core barrel have disclosed two possible mechanisms by which the core is changed from its original state, a water drive ahead of the drilling bit, which produces oil from the core and displaces the connate water from its equilibrium position, and a radial invasion which leaves the outer part of the core extensively polluted with water from the drilling mud.

Analysis of drilling mud in core barrel has given a more complete account of the salt content of the core than was heretofore available. Thus, a more reliable estimate of connate water now can be made which is important in the estimation of oil reserves. Evidence is given that the connate water is not water entirely bound to the shales and other minerals of the rock but it is, in part at least, a liquid capable of motion.

Oil produced from the core with pressure relieved has been measured. In a given horizon, a correlation between the oil produced and the initial potential of the well was observed.

It is now possible to give a more complete account of the materials that filled the pore spaces of the core at the time the was taken; also giving more detailed account of fluid contents of a core. Part of the pore volume unaccounted for by the analysis is due to a portion of that water from the drilling mud that was in the outer part of the core being forced out of the core under influence of expanding gas in inner portion of the core.

Core recovery in Illinois averages 80 percent of the core cut. The barrel cuts a core 2⅜ inches in diameter, and 8½ feet

long. Pressure is recovered in 90 percent of the runs.

Rotary-table speeds of from 50 to 70 revolutions, drilling pressures of from 200 to 500 pounds, and drilling weights of from 10,000 to 12,000 pounds are conventional operating practices.

Proper mud condition while coring is extremely important. Following properties are satisfactory: weight, 10.5 to 11 pounds per gallon; viscosity, 35 to 38 seconds; water loss, 20 to 35 ml per ½ hour on a 3-inch diameter plate at pressure of 100 pounds, and sand content not more than 5 percent by volume.

It is believed that the pressure core barrel has shown many advantages over the conventional coring tools, and has yielded interesting and important information.

**Treatment of Oil Sands with Surface-Active Chemicals**

By C. F. Bonet,
*American Cyanamid and Chemical Corporation*

While there are a number of independent forces acting while an oil well is producing, the production is proportional to the porosity and oil saturation of the sand, and the permeability of the sand. A majority of oil sands also contain varying amounts of water, some of which is not active either as a mobile agent to drive the crude or as a static presence surrounding the sand grains. If there is sufficient water present, as when the water saturation exceeds 15 percent, the water interferes with the flood of oil, and if enough water saturation exists water and oil will be produced together.

**C. F. Bonnet**

When this action obtains, the water gradually increases in relation to the volumes of oil produced, an action that operators counteract by holding a back pressure, other pressure control, or through plugging that section of the sand body producing the water. In addition to the water volumes produced, there is another action taking place in the formation, wetting the sand grains with water. As a greater affinity exists between water and sand grains, compared with oil and the same sand grains, the watering or wetting of the formation in the vicinity of the well bore is progressive. The further this action progresses, the greater will be that portion of the producing horizon adversely affected by water, and in a measure actively retarding the free flow of crude into the well.

Through use of certain surface-tension depressants, this normal action is reversed. By treating the water in the sand with these compounds, the water is flushed by having its molecular tension or its adhering property materially reduced. In such case, the oil increases over the water in direct contrast with normal action.

By nature, surface-active chemicals are semi-soluble in water. A part of the compound might be said to be water-soluble, while the opposite portion of the compound is insoluble in water but soluble in some other liquid, such as oil. The result is that these agents collect at the boundary of the water volumes, and make their presence apparent by their inherent quality of changing the normal surface mechanism of the water.

**Factors Affecting the Use of Gravel in Oil Wells**

By Kenneth E. Hill,
*College of Mining, University of California*

Use of gravel adjacent to the liners of oil wells is intended to decrease sand production and increase the oil production rate. Theoretically and practically, both of these purposes can be attained by use of gravel which has a size ratio of eight when compared to the diameter of the sand at the 10-percentile point on the cumulative screen analysis.

**K. E. Hill**

However, due recognition must be given to fundamental laws underlying use of the frequency cumulative curves in the choice of gravel size for screening unconsolidated sand. Thickness of gravel should be at least five gravel grain diameters.

Major increases in production due to gravel packing may be obtained with increases in permeability of the gravel over the formation sand of 20, and with thickness of 12 inches.

Preliminary field results indicate that, after initial flush production, gravel-pack wells have higher production rates, better sustained rates, and results in greater cumulative production than conventionally completed offset wells. This is a result of the ability to produce the gravel-pack wells at a greater percentage of their true potential capacity. Productivity indices, lower for gravel-pack wells than for conventional wells, are thought to be due to the use of mud instead of oil as the circulating medium. Failure to wash the mud completely and properly out of the remote recesses of the gravel and away from the formation walls decreases productivity.

# Legislation

## *Conservation Proponents Appear on Behalf of Bill*

Legislative discussion of an administration-supported Illinois oil conservation bill continued in the state senate May 21 with a second public session of the gas and oil conservation committee.

With less than five weeks remaining in the current legislative session, proponents of the bill, which has been approved by Governor Dwight H. Green, charged opponents with arousing "prejudice in the minds of the public against any form of regulatory measure."

Harold Williams, Taylorville, president of the Independent Oil Producer's Association of Illinois, who was the first witness to appear in behalf of the measure, denied the bill contains a proration feature.

"Governor Green has said repeatedly," he declared, "that this is not a proration bill. The governor is right about this. Proration is well understood by the oil industry. Proration means the limitation of the output of a pool, a well or an area of a state, down to a figure determined by ascertainments of the market demands for oil of the well, the pool, the area or of the state.

"This bill," he said, "contains no such authority. It contains authority to limit production of a well or a pool under only the most exceptional circumstances."

Williams charged opposition speakers with claiming enactment of an Illinois oil conservation bill "will drive independent operators out of the state and curtail future development. This, in my opinion, is most erroneous, because in reality sound conservation will do much to benefit the independent operator."

Following the session, which was marked by frequent verbal clashes in the chamber between speakers and senators, Senator Charles Carpentier, East Moline, committee chairman, said the hearing will recess until May 28 when the bill will be considered in an executive session of the upper house.

Opposition to the bill, which proposes creation of a three-man commission appointed by the governor to control and regulate Illinois oil production "for the prevention of waste," was launched May 14 at an initial hearing by a group of independent operators, royalty owners, farmers and merchants headed by former Governor John Stelle and Charles Vurcell, Salem Republican leader and newspaper publisher.

Attorney A. K. Swan, Evansville, Indiana, secretary of the Tri-State Petroleum Association, who led opposition speakers at the second session, charged the bill "is full of more tricks than a circus dog" and that "if passed it will drive the little fellow out of business in Illinois at the expense of the major oil companies.

Swan, in an analysis of legal features of the proposed measure, said "the bill contains a dangerous clause dealing with 'underground waste'—a feature which is an entering wedge toward outright proration—the same thing that happened in Texas with dire results to the independent operator there."

Other speakers who appeared against the measure as representatives of the Illinois Oil & Farm Owners Equity Association included Charles Crowder, operator of a radio station at Tuscola, who produced a basketful of letters which assertedly were received at his station from farmers and landowners objecting to the bill.

A. B. Anderson, McLeansboro, farmer's representative and Republican leader, told the committee "farm prosperity in southern Illinois resulting from current development will be retarded if this bill becomes a law."

A bill vesting regulatory power over the state's oil industry in the Department of Mines and Minerals will be introduced within the next week in the senate by Senator R. G. Crisenberry, Murphysboro, opponents of the major bill said. The new measure, they declared, would incorporate all regulatory features embodied in the original bill with the exception of "proration and closely related clauses."

Dorsey Hager, Centralia, technical adviser of the independent operator's group, said "the bill is being introduced in order to answer the charge that we are not offering anything constructive for the Illinois oil industry."

Williams in his address said he was also speaking for the Indiana-Illinois Petroleum Association, headed by Alex McCandless, Robinson.

Besides the Illinois Oil & Farm Owner's Equity Association, opponents included the Petroleum Association of Illinois, headed by Sam Jarvis, and the Tri-State Petroleum Association, led by George Schoonmaker, Evansville.

# Varied Program Arranged for National Scouts Meeting

MEMBERS of the National Oil Scouts & Landmen's Association, who will hold their eighteenth annual convention in Dallas May 29-31, will participate in a program varied by discussions of fifth-column activities, general problems facing the petroleum industry, and technical questions.

The meeting, which promises to be one of the most successful in the organization's history, will hold sessions in the Adolphus Hotel. The Dallas Petroleum Club has extended delegates privileges of its quarters in the hotel during the convention.

Registration will start at 10 a. m. Thursday in the hotel lobby, with a meeting of officers, directors and the convention committee set for 3:30 p. m. A cocktail party for members, ladies and guests in the quarters of the Dallas Petroleum Club has been set for 5 p. m., with dining and dancing in the Century Room of the Adolphus Hotel between 8 p. m. and midnight.

C. J. Bradley, association president, will preside over the Friday morning session, to be held on the roof garden of the hotel. Speakers will be John G. Pew, Sun Oil Company, on the subject of "Unity"; Dr. Joseph H. Pogue, vice president of Chase National Bank, New York, on "Regulation Without Regimentation: The Oil Industry's Contribution to Our Economy," and E. R. Albert, Jr., Baroid Sales Division, Tulsa, on "Well Logging."

Motion pictures showing capping of wild wells will be shown by Cameron Iron Works, Inc., Houston.

A fashion show and luncheon have been arranged for the ladies Friday noon. A golf tournament at Lakewood Country Club will open at 1 p. m.. Friday afternoon, while association officers and directors will meet with district association presidents at 3:30 p. m. A stag party from 7 to 10 p. m. has been arranged for members, while ladies will attend a theater or cocktail party.

Representative Martin Dies, representing the second Texas district, will address the Saturday morning session on "The Enemies Within." His address will be followed by the business meeting and election of officers.

While ladies attend a bridge party Saturday afternoon, in-coming and outgoing officers will meet in the president's suite. A barbecue has been arranged for late Saturday afternoon at the home of D. Harold Byrd. The annual dance will start at 9:30 p. m.

Officers of the association, in addition to Bradley, are H. L. Eversberg, Shell Oil Company, Baton Rouge, first vice president; R. H. Weaver, Sun Oil Company, Jackson, Mississippi, second vice president; R. L. Denton, Magnolia Pipe Line Company, Kilgore, secretary-treasurer; W. E. Tracy, The Ohio Oil Company, Bridgeport, Illinois, editor-in-chief; C. P. Chisholm, The Pure Oil Company, Houston, board chairman, and E. J. Raisch, Austin, executive secretary.

Weaver, general convention committee chairman, is being assisted by the following: Edward C. Harman, Seaboard Oil Company, Dallas, general chairman; R. F. Morgan, Texola Producing Company, Dallas, co-chairman; S. G. Gladney, Sun Oil Company, Dallas, entertainment; E. L. Wilson, American Maraicabo Corporation, Dallas, finance; John T. Langston, Sun Oil Company, Dallas, publicity; Wade Smith, Magnolia Petroleum Company, Dallas, transportation; E. A. Brown, Lone Star Gas Company, exhibits; J. W. Burrage, Lone Star Gas Company, Dallas, program; Duke T. Segrest, Adolphus Hotel, Dallas, hotel reservations; Z. E. Black, Dallas, chamber of commerce; Troy Stalls, Stanolind Oil Purchasing Company, Wichita Falls, attendance; S. C. McKinney, Shell Oil Company, Tyler, Texas, reception and finance, and W. L. Allen, Gulf Oil Corporation, Marshall, golf and entertainment.

**C. J. BRADLEY, President**

**C. P. CHISHOLM, Board Chairman**

**E. J. RAISCH, Executive Secretary**

## *Washington*

[*Continued from page 39*]

The supplying of the Atlantic Coast with oil is essentially a problem of transportation, it was explained. During 1940, nearly 1,400,000 barrels of crude and refined products were delivered daily to Atlantic ports and it is expected that needs this year will require a daily delivery of at least 1,500,000 barrels, 83 percent from the Gulf. This would require the services of 260 tankers, but the number actually engaged in that traffic this year already has declined from 272 in January to 253 in April, as a consequence of which it has been necessary to draw upon oil held in storage along the Atlantic Coast.

**Tanker Situation Reviewed**

At the same time, the Maritime Commission this month asked the tanker owners to turn over 50 ships for shuttle service between the Caribbean or Gulf to North Atlantic ports for the carriage of oil for Britain. Twenty-five vessels already have been turned over, 20 of them being taken from the Gulf-Atlantic routes, and the comission now has asked for the remaining 25. One result has been a sharp increase in tanker rates.

"The transfer of the second group of tankers will cut deeper into the Gulf-to-Atlantic fleet," it was declared. "Eighty percent of our American-flag tankers normally operate in that service; hence, it is that service which must be affected most seriously by these transfers. The net effect of these transfers probably will be to reduce the fleet in this service to about 210 ships, or 50 less than the 260 tankers needed.

"It is obvious that other means of moving oil to the Atlantic Coast must be provided without delay if we are to avoid the higher prices, and possibly the restriction of oil consumption to essential uses, which are certain to follow this contraction of our customary transportation facilities. A definite effort is being made at present to utilize existing pipe-line and rail facilities to the fullest possible extent, but such changes can only add the proverbial 'drop in the bucket.' The problem is that of providing new ways of shipping about 100,000,000 barrels of oil to the Atlantic Coast this year, and that cannot be done unless additional pipe lines of large capacity are built immediately."

The major question, the subcommittee commented, is whether such pipe lines can be completed in time to avoid a crisis in the present serious situation, particularly large-capacity lines to transport crude from the Mid-Continent and Southwest to the principal refining centers of the Atlantic Coast which has been discussed.

However, it added, "if these lines are built and if the new tankers which are under construction are completed on schedule, we probably will close the year in a fairly satisfactory position with respect to oil transportation."

In the production of tankers, the assistance of the Maritime Commission and the new building methods which have been developed are seen as cutting the time required for construction but, it was warned, two or three years will be required for the full delivery of the approximately 140 ships now under construction "and the most that may be expected in the immediate future is the delivery of approximately two finished boats per month."

## *Call Producers to Washington For Price Probe*

Crude oil producers and buyers will be called to Washington in the near future to discuss the crude price situation with officials of the Office of Price Administration and Civilian Supply.

The decision of the OPACS to call the producer group in followed a conference May 23 with representatives of the 22 leading oil companies operating in the New England and Mid-Atlantic areas on recent price trends for gasoline, industrial fuel oil and lubricants.

The representatives of the companies met with Dr. J. K. Galbraith, head of the price division, and Quinn Shaughnessy, recently named price executive in charge of the fuel section of the price division, who have been concerned over price increases on oil products along the Eastern seaboard.

The industry men explained that the increases so far have been due to the elimination from the market of distress gasoline stocks which previously had depressed prices, and actual increases in costs of production and transportation.

They agreed, however, although with some reservations, that no further substantial increases in gasoline prices are called for unless basic cost conditions change, and acceded to a request by the OPACS officials not to make further increases of a substantial character in gasoline prices until after consultation with Leon Henderson, administrator of the agency.

The conference with the refiners and marketers was the first action taken by the new fuel section of the price division, which was set up only a few days before the meeting. The duties of the section, the first to be established to handle a specific commodity, will be to maintain a check upon oil prices and keep abreast of developments in the situation.

Head of the new section is M. Quinn Shaughnessy, assistant director of the registration division of the Securities and Exchange Commission.

The OPM this week also concerned itself with the problem of steel supply for the oil industry, officials of the production division calling a conference of steel men and oil company representatives to meet May 27 to discuss the need for steel for the construction of new pipe lines.

It was stressed that the conference would not involve rationing or conservation of petroleum, with which the steel division is not concerned, but would take up the possibilities of substitutes for steel in the event of necessity.

It was pointed out that pipe lines projected under the Cole bill authorizing the President to vest pipe line companies with the right of eminent domain, initially to be exercised in the case of the Baton Rouge-Greensboro and Port St. Joe-Chattanooga lines held up by the refusal of the Georgia railroads to permit crossing their tracks, may bring a demand for large quantities of steel and a heavy burden on the already hard-pressed steel industry.

Construction of pipe lines, strongly supported by President Roosevelt, is accepted as an important need of the national defense program and the conference will discuss ways and means of providing a supply of the necessary materials without depriving other equally or more important users of the metal.

## *Boyd Elected Chairman Transport Committee*

W. R. Boyd, Jr., executive vice president of the American Petroleum Institute, May 23 was elected chairman of the fact finding committee appointed last week by the Institute at the request of the Office of Production Management.

Serious problems concerning the adequacy of transportation facilities to supply all the petroleum products needed on the Eastern seaboard because of the diversion of a large number of the tankers upon which that section is dependent for more than 95 percent of its supplies are being studied by the committee.

A subcommittee representative of various types of transportation used by the industry was appointed and was asked to begin working immediately to obtain the facts needed.

OPM officials have requested the fact finding committee to report to them as soon as possible with recommendations as to the various means which may be employed to offset the potential shortage in petroleum supplies in this heavy consuming area.

The general committee will meet again in New York Thursday, May 29 to receive the report of its subcommittee. Two new members named to the general committee in addition to the 22 appointed last week are William F. Humphrey, Tide Water Associated Oil Company, New York, and L. J. Drake, Union Tank Car Company, Chicago.

Attending the May 23 meeting in addition to the committee members were: E. E. Soubry, representative of the British Government, and M. M. W. Bowen, representative of the U. S. Maritime Commission.

## *Socony-Vacuum Investigates Coal to Conserve Fuel Oil*

Socony-Vacuum Oil Company announced last week, in a move described as designed to help meet a threatened shortage of fuel oil on the Atlantic seaboard, it was discontinuing burning of fuel oil in its New York building at 26 Broadway to reduce the demand for heavy fuel oil in the city by some 12,000 barrels per year.

The company also is investigating the possibility of substituting coal for oil in its refineries on the Eastern seaboard.

The company plans to release at least two tankers for the Atlantic coast trade by the following two methods:

The company has increased movement of crude oil into Buffalo through pipe line by about 5000 barrels per day. This oil will be transhipped at Buffalo by canal barges to its refinery at New York.

The company will release another taker by using two of its Mississippi River barge-and-tug units to move gasoline from the southwest up the Mississippi and Ohio Rivers into Pittsburgh, instead of shipping by tanker to the Atlantic seaboard for transhipment to the interior.

## *Product Prices Continue Rise After General Crude Advance*

In the wide advance of crude and refined oil prices last week, postings for crude were raised virtually everywhere in the country outside California, and practically all products were marked up by most refiners and resellers.

The crude price advance was initiated when Shell Oil Company, effective May 19, advanced postings 10 cents a barrel for Oklahoma, Kansas, and Benton, Illinois, crudes. The increase immediately was supported when Phillips Petroleum Company and Skelly Oil Company similarly raised 10 cents in the Mid-Continent. And by May 22 10-cent increases had been posted by nearly all purchasers in Illinois, Indiana, Western Kentucky, Kansas, Oklahoma, Texas, New Mexico, Louisiana, Arkansas, and Rocky Mountain areas where Mid-Continent gravity scale prices prevailed. Meanwhile (May 21), a 15-cent increase was posted generally by purchasers of Pennsylvania grade crude.

No announcements were made in connection with the increases, but reasons for the raises were evident. The increases resulted from the wide combination of circumstances that included: declining production in production in Illinois and Michigan, production near capacity in Oklahoma, record-breaking demand, improving prices of all the refined oils, mounting taxes and costs of operations, and the general upward movement of prices of all commodities and wages.

The effect of these factors was only partially recognized in the small crude raises of the Mid-Continent (5 to 7 cents a barrel) March 29-April 1, and even at that time it was contended by many that the increases were not sufficient to compensate for increased taxes and operating costs. Since April 1 prices of virtually all commodities have increased materially further, and since that time most oil companies have increased wages 5 percent or more.

The crude raises of last week, while unquestionably justified, were made possible by the steady improvement of prices of refined products.

Gasoline tank car prices were up at least ⅛ cent a gallon everywhere, and in some instances, quotations were ¼ to ½ cent higher than a week previously. Natural gasoline was up ¼ cent a gallon in the Mid-Continent. On the Atlantic Coast, even sharper increases in gasoline prices were posted, ranging from ½ to 1 cent a gallon, apparently in reflection of the tanker shortage as well as the increasing prices in the primary markets.

Kerosene was quoted ⅛ to ¼ cent a gallon higher by refiners in the Mid-Continent and by refiners and resellers in the Middle West, and a ⅛ cent increase was made also on the Atlantic Coast.

Light fuel oils, although out of season and going to storage, also were marked up ⅛ cent a gallon by Oklahoma-Kansas refiners and by resellers on the Atlantic Coast.

Heavy fuel oils were advanced 5 cents a barrel by Mid-Continent and Middle Western refiners, following a similar increase the week before, although prices of those oils remained unchanged on the Gulf Coast and the Atlantic Coast.

Diesel oil moved up 5 cents a barrel on both the Atlantic and Pacific Coasts.

Lubricants shared in the increases. Bright stocks were advanced ½ to 1 cent a gallon in Oklahoma and 1 cent in Western Pennsylvania. Neutral oils were up ½ cent in the Mid-Continent and were 1 to 2 cents higher in Pennsylvania.

Present prices of crude in Mid-Continent are in nearly all instances 10 cents a barrel higher than March 29-April 1 postings, as published in these colums May 5, page 48. Oklahoma-Kansas 36-36.9-gravity oil, for example, now is $1.17 a barrel. Oklahoma-Kansas 34-34.9 gravity oil, which in recent years has been priced very close to the average crude price for the whole country, now is $1.13 a barrel. East Texas crude last week was raised to $1.25 a barrel.

Michigan crudes, which were raised in the April 1 readjustments, also were further increased 10 cents a barrel May 1, and postings in that state late last week were 10 cents a barrel higher than prices shown in these columns in the May 5 issue.

Through the 15-cent increase of May 21, Pennsylvania grade crudes were: Bradford - Allegany, $2.55 a barrel; Southwest Pennsylvania, $2.20; Eureka, $2.14; and Buckeye, $2.10.

## *Favorable Statistical Trends Of Oil Industry Are Extended*

Statistical trends in the industry continued favorable in the week ended May 17, figures from the American Petroleum Institute indicated. Crude oil production continued close to market demand. Refinery runs of crude were reduced slightly but remained exceptionally large, in line with current record-breaking demand for petroleum products. Gasoline stocks were reduced by a normal amount for the season.

United States crude oil production averaged 3,784,450 barrels daily, 28,350 more than in the previous week and about 15,000 barrels a day less than market demand, as estimated for May by the Bureau of Mines. The production was 1.3 percent less than that in the corresponding week last year.

Crude runs to stills were lowered to 3,805,000 barrels daily from the all-time high of 3,821,000 barrels of the previous week, and the new rate was 5.5 percent above the 3,607,000-barrel daily average runs of May last year.

Total stocks of finished and unfinished gasoline in the United States came down from 95,703,000 to 94,867,000 barrels in the week of May 17, and at the latter level were 7,300,000 barrels (7.2 percent) under the total of 102,167,000 barrels a year ago.

Aviation gasoline in storage now

## Trends of Operations and Changes in Stocks

**Figures are from American Petroleum Institute weekly reports, except those on crude stocks, which are from Bureau of Mines weekly reports**

| WEEK ENDED | Crude Oil Production (Barrels Daily) | Crude Runs to Stills (Barrels Daily) | Crude Oil Stocks (Barrels) | Gasoline Stocks (Barrels) | FUEL OIL STOCKS | |
|---|---|---|---|---|---|---|
| | | | | | Gas Oil & Dist. Fuels | Residual Fuel Oil |
| **1938:** | | | | | | |
| November 12 | 3,243,250 | 3,180,000 | 273,394,000 | [6]67,551,000 | 34,175,000 | 120,491,000 |
| December 10 | 3,245,100 | 3,150,000 | [2]269,509,000 | 68,687,000 | 32,068,000 | 118,711,000 |
| **1939:** | | | | | | |
| April 22 | 3,526,700 | 3,280,000 | 277,156,000 | [2]87,769,000 | 21,085,000 | 105,035,000 |
| April 29 | 3,568,200 | 3,405,000 | 278,440,000 | 86,794,000 | [7]25,844,000 | [7]108,409,000 |
| May 6 | 3,580,900 | 3,275,000 | [2]278,607,000 | 86,216,000 | 26,167,000 | 108,597,000 |
| August 5 | [1]3,909,400 | 3,445,000 | 268,982,000 | 76,431,000 | 35,601,000 | 114,512,000 |
| August 26 | [1]1,690,800 | 3,475,000 | 246,982,000 | 73,475,000 | 37,722,000 | 116,237,000 |
| October 7 | 3,435,850 | 3,505,000 | 231,564,000 | [6]71,152,000 | 38,549,000 | 114,397,000 |
| October 21 | 3,771,550 | [2]3,650,000 | [3]229,127,000 | 72,122,000 | 39,358,000 | 115,060,000 |
| **1940:** | | | | | | |
| January 27 | 3,611,600 | 3,470,000 | 237,339,000 | 87,914,000 | 27,407,000 | 103,015,000 |
| February 24 | 3,732,100 | 3,490,000 | 240,836,000 | 96,719,000 | 25,390,000 | 103,419,000 |
| March 30 | 3,841,250 | 3,585,000 | 250,561,000 | 101,370,000 | 23,778,000 | 105,081,000 |
| April 20 | 3,858,550 | 3,535,000 | 254,881,000 | [1]102,817,000 | 24,779,000 | 103,323,000 |
| April 27 | 3,845,250 | 3,555,000 | 256,670,000 | 102,452,000 | 24,997,000 | 102,552,000 |
| May 25 | 3,835,650 | 3,580,000 | 259,330,000 | 100,297,000 | 28,356,000 | 104,015,000 |
| June 22 | 3,846,450 | [2]3,690,000 | 260,891,000 | 97,276,000 | 32,751,000 | 104,683,000 |
| June 29 | 3,639,550 | 3,625,000 | 262,059,000 | 95,142,000 | 33,590,000 | 104,486,000 |
| July 27 | 3,690,400 | 3,555,000 | 262,579,000 | 90,173,000 | 38,981,000 | 105,924,000 |
| August 31 | 3,501,350 | 3,575,000 | 265,865,000 | 85,393,000 | 44,766,000 | 108,774,000 |
| September 28 | 3,799,950 | 3,600,000 | 263,609,000 | 82,273,000 | 47,986,000 | 108,450,000 |
| October 26 | 3,640,300 | 3,565,000 | 262,746,000 | 80,891,000 | [4]8,893,000 | 108,475,000 |
| November 9 | 3,584,200 | 3,510,000 | 261,631,000 | [6]79,847,000 | 48,408,000 | 107,687,000 |
| November 30 | 3,335,050 | 3,510,000 | 262,679,000 | 80,284,000 | 46,212,000 | 106,618,000 |
| December 28 | 3,385,500 | 3,585,000 | 261,552,000 | 83,274,000 | 42,266,000 | 102,620,000 |
| **1941:** | | | | | | |
| January 25 | 3,599,100 | 3,625,000 | 260,093,000 | 88,762,000 | 39,039,000 | 100,297,000 |
| February 22 | 3,629,650 | 3,590,000 | 261,783,000 | 95,812,000 | 34,381,000 | 98,631,000 |
| March 1 | 3,632,250 | 3,585,000 | 263,176,000 | 96,917,000 | 33,725,000 | 97,510,000 |
| March 29 | 3,746,550 | 3,625,000 | 266,187,000 | [2]99,727,000 | 29,949,000 | 96,152,000 |
| April 26 | 3,726,850 | 3,675,000 | 266,149,000 | 96,647,000 | 29,543,000 | 94,732,000 |
| May 3 | 3,507,100 | 3,735,000 | 265,728,000 | 96,328,000 | 30,309,000 | 94,414,000 |
| May 10 | 3,756,100 | [1]3,821,000 | 263,994,000 | 95,703,000 | 31,548,000 | 94,407,000 |
| May 17, 1941 | 3,784,450 | 3,805,000 | ..... | 94,867,000 | 31,882,000 | 93,987,000 |
| May 17, 1940 | 3,835,100 | [8]3,607,000 | [4]257,079,000 | 102,167,000 | 26,706,000 | 102,785,000 |
| Change in past year | —1.3% | +5.5% | +2.7% | —7.2% | +19.4% | —8.6% |

[1] All time peak. [2] Peak for year. [3] Lowest since April, 1922. [4] Stocks, May 11, 1940.
[5] Lowest since October, 1922, due to shut down of six mid-continent states. [6] Lowest for year.
[7] Prior to April 29, 1939, data did not include stocks at terminals, in transit, etc., except in California.
[8] May, 1940, daily average.

# Wholesale Prices of Refined Products in Principal Markets

| REFINED GASOLINE | Range Last Week (Cents a gal.) | | Changes from Week Before | |
|---|---|---|---|---|
| **Oklahoma Refineries:** | | | | |
| 60 Octane and under | 4½ | 5¼ | +¼ | +½ |
| 63-66 Octane | 4⅞ | 5⅝ | +¼ | +½ |
| 72-74 Octane | 5¼ | 6 | +¼ | +½ |
| 80-82 Octane, Ethyl | 5⅞ | 6½ | +⅛ | +½ |
| **Mid-Western Tank Car:** | | | | |
| 60 Octane and under | 4½ | 5¼ | +¼ | +½ |
| 63-66 Octane | 4⅞ | 5⅝ | +¼ | +½ |
| 72-74 Octane | 5¼ | 6 | +¼ | +½ |
| 80-82 Octane, Ethyl | 6⅜ | 6⅜ | +¼ | +½ |
| **New York Harbor:** | | | | |
| 68-70 Octane | 7½ | 7½ | +½ | ... |
| 72-74 Octane | 7½ | 8 | +½ | +½ |
| Min. 80 Octane, '39 Research | 8 | 8½ | +½ | +½ |
| **Gulf Coast:** | | | | |
| 60 Octane unleaded | 5 | 5¼ | ... | +¼ |
| 65 Octane unleaded | 5¼ | 5½ | ... | +¼ |
| 68 Octane unleaded | 5⅝ | 6 | ... | +¼ |
| 70 Octane unleaded | 5¾ | 6 | ... | +¼ |
| 72-74 Octane leaded | 5½ | 5¾ | ... | ... |
| Min. 80 Octane, '39 Research | 5⅝ | 6 | +⅛ | +½ |
| **NATURAL GASOLINE** | | | | |
| **Grade 26-70:** | | | | |
| F.O.B. Group 3 | 3¼ | 3½ | ... | +¼ |
| F.O.B. Breckenr'ge, Tex. | 3 | ... | ... | ... |
| **KEROSENE** | | | | |
| **Oklahoma Refineries:** | | | | |
| 41-43 water white | 4¼ | 4¾ | ... | +¼ |
| 42-44 water white | 4⅜ | 4⅞ | ... | +⅛ |
| **Mid-Western Tank Car:** | | | | |
| 41-43 water white | 4¼ | 4¾ | ... | +¼ |
| 42-44 water white | 4⅜ | 4⅞ | ... | +¼ |
| **New York Harbor** | 5¼ | 5¼ | +⅛ | +⅛ |
| **RANGE OIL** | | | | |
| At Oklahoma Refineries | 3⅞ | 4⅛ | ... | ... |
| In Mid-Western Market Group 3, basis | 3⅞ | 3⅞ | ... | ... |
| **LIGHT FUEL OILS** | | | | |
| **Oklahoma Refineries:** | | | | |
| No. 1 straw | 3⅝ | 3⅞ | ... | +¼ |
| No. 3 | 3¼ | 3½ | ... | +⅛ |
| **Mid-Western Tank Car:** | | | | |
| No. 1 white | 3¾ | 4 | ... | ... |
| No. 3 | 3¼ | 3⅜ | ... | ... |
| **New York Harbor:** | | | | |
| No. 1 | 5¼ | 5¼ | +⅛ | +⅛ |
| No. 3 | 4⅞ | 4⅞ | ... | ... |

| HEAVY FUELS | Range Last week (Per Bbl) | | Changes from week Before | |
|---|---|---|---|---|
| **Oklahoma Refineries:** | | | | |
| No. 6 | $0.70 | $0.80 | ... | +.05 |
| **Mid-Western Tank Car:** | | | | |
| No. 5 | .85 | .85 | +.05 | ... |
| No. 6 | .80 | .85 | +.05 | +.05 |
| **New York Harbor:** | | | | |
| No. 5 | 1.55 | 1.65 | ... | ... |
| No. 6 | 1.25 | 1.35 | ... | ... |
| **BUNKER C FUEL OIL (Per barrel, ships' bunkers)** | | | | |
| Gulf Coast | $ .85 | $ .90 | ... | ... |
| New York Harbor | 1.25 | 1.35 | ... | ... |
| **DIESEL OIL (Per barrel, ships' bunkers)** | | | | |
| Gulf Coast | $1.45 | $1.50 | ... | ... |
| New York Harbor | 2.00 | 2.00 | +.05 | +.05 |
| Los Angeles Basin, 27 gravity | 1.10 | 1.15 | +.05 | —.05 |
| **LUBRICATING OIL (Cents a gal.)** | | | | |
| **Oklahoma Refineries:** | | | | |
| Bright Stock, 150-160 viscosity at 210°, 10-25 pour test | 16 | 16½ | +1 | +½ |
| Neutral oil pale No. 3 color, 150 viscosity at 100°, 0-10 pour test | 9½ | 10¼ | +½ | ... |
| **Western Pennsylvania:** | | | | |
| Bright Stock, 145-155 viscosity at 210°, 25 pour test | 19 | 20 | +1 | +1 |
| Neutral Oil No. 3 color, 150 viscosity at 70°, 25 pour test | 26 | 28 | +2 | ... |

totals 7,252,000 barrels, compared with only 5,351,000 barrels on hand a year ago, the increment having been made in line with expanded requirements. Ordinary gasoline stocks at present amount to 87,615,000 barrels, being 9,201,000 barrels (9.5 percent) smaller than those of 96,816,000 barrels in storage at this time last year.

Stocks of gas oil and distillate fuel totaled 31,882,000 barrels on May 17, having increased from 31,548,000 barrels a week previously. The new total was about 5,000,000 barrels (19.4 percent) greater than that of 26,706,000 barrels on hand a year before.

Residual fuel oil in storage May 17 totaled 93,987,000 barrels, following a decrease of about 400,000 barrels within a week. The inventory then was about 9,000,000 barrels smaller than a year previously, although that decrease has been altogether on the West Coast, stocks east of California being somewhat larger than at this time last year.

Crude oil stocks were reduced from 265,728,000 to 263,994,000 barrels in the week ended May 10, the Bureau of Mines reported. The crude storage is about 7,000,000 barrels (2.7 percent) larger than a year ago.

## *Crude Output Down as Some States Fail to Meet Demand*

United States crude oil production dropped about 25,000 barrels below indicated daily market demand in the past week, ended May 24, after having conformed almost exactly with demand in the preceding week, output having aver-

# Crude Production Drops Slightly Below Demand

## Estimates Compiled by The OIL WEEKLY

| DISTRICT OR STATE | Bureau of Mines Estimate of Daily Demand (May) | State Allowable (Barrels Daily in May) | BARRELS DAILY FOR WEEK ENDED May 17 | BARRELS DAILY FOR WEEK ENDED May 24 |
|---|---|---|---|---|
| **TEXAS—** | | | | |
| Texas Panhandle | | | 79,300 | 76,700 |
| North Texas | | | 99,500 | 99,500 |
| West Central Texas | | | 30,400 | 30,200 |
| West Texas | | | 258,100 | 258,600 |
| East Central Texas | | | 78,300 | 79,200 |
| East Texas Field | | | 374,000 | 374,100 |
| South Texas | | | 209,700 | 210,300 |
| Texas Gulf Coast | | | 277,400 | 275,700 |
| **Total Texas** | 1,382,200 | 1,367,619§ | 1,406,700 | 1,404,300 |
| **CALIFORNIA—** | | | | |
| Long Beach | | | 42,100 | 41,900 |
| Midway-Sunset | | | 50,300 | 40,300 |
| Kettleman Hills | | | 40,700 | 41,300 |
| Wilmington | | | 84,100 | 85,600 |
| Others | | | 421,500 | 412,600 |
| **Total California** | 598,100 | 571,000* | 638,700 | 621,700 |
| **OKLAHOMA—** | | | | |
| Oklahoma City | | | 88,100 | 88,700 |
| Seminole Area | | | 109,650 | 107,500 |
| Others | | | 217,650 | 217,425 |
| **Total Oklahoma** | 440,000 | 400,000 | 415,400 | 413,625 |
| **ILLINOIS—** | | | | |
| Salem | | | 94,800 | 91,200 |
| Louden | | | 64,200 | 69,100 |
| Centralia | | | 11,500 | 10,900 |
| Other New Pools | | | 145,400 | 149,500 |
| Old Pools | | | 11,500 | 10,700 |
| **Total Illinois** | 336,100 | ... | 327,400 | 322,400 |

| DISTRICT OR STATE | Bureau of Mines Estimate of Daily Demand (May) | State Allowable (Barrels Daily in May) | BARRELS DAILY FOR WEEK ENDED May 17 | BARRELS DAILY FOR WEEK ENDED May 24 |
|---|---|---|---|---|
| **LOUISIANA—** | | | | |
| North Louisiana | | | 71,500 | 73,100 |
| South Louisiana | | | 241,800 | 246,500 |
| **Total Louisiana** | 320,300 | 320,324 | 313,300 | 319,600 |
| **KANSAS** | 213,900 | 217,900 | 218,200 | 216,950 |
| **NEW MEXICO** | 113,900 | 114,000 | 112,600 | 113,800 |
| **EASTERN STATES—** | | | | |
| Pennsylvania Grade | 49,100 | | 72,500 | 72,200 |
| Others, Eastern | 53,200 | | 19,400 | 19,100 |
| **Total Eastern States** | 102,300 | ... | 91,900 | 91,300 |
| **MOUNTAIN STATES—** | | | | |
| Wyoming | 90,900 | | 81,200 | 81,500 |
| Montana | 21,300 | | 19,300 | 19,000 |
| Colorado | 5,200 | | 3,700 | 5,200 |
| **Total Mountain States** | 117,400 | ... | 104,200 | 105,700 |
| **MICHIGAN** | 40,000 | 36,000† | 37,600 | 38,100 |
| **INDIANA** | 23,900 | ... | 20,800 | 20,200 |
| **ARKANSAS** | 83,900 | 76,673 | 75,800 | 73,600 |
| **MISSISSIPPI** | 22,900 | ... | 31,900 | 27,500 |
| **NEBRASKA** | 4,800 | ... | 4,350 | 4,300 |
| **‡Total 8 Prorated States** | 3,192,300 | 3,103,516 | 3,218,300 | 3,201,675 |
| **Total United States** | 3,799,700 | ... | 3,798,850 | 3,773,075 |

* Recommendation of Conservation Committee of California Oil Producers.
† Estimate of actual production under prescribed regulations, which do not fix a definite state total allowable.
‡ Texas, California, Oklahoma, Louisiana, Kansas, New Mexico, Arkansas, Michigan.
§ Texas State Railroad Commission's estimate of actual net daily production allowing for usual under-production of 3½ percent under net allowable, which at the beginning of May is calculated at 1,417,222 barrels daily. However, allowable normally increases as new wells are completed. Under May order, most Texas fields were ordered shut down May 3, 4, 10, 11, 17, 18, 24, 25 and 31. Texas Panhandle was ordered shut down May 10, 17, 24 and 31.

aged 3,773,075 barrels daily for the new period. In the eight prorated states, last week's production was, however, about 10,000 barrels above estimated market requirements for crude from those states. Illinois meanwhile failed by 14,000 barrels daily of meeting demand, and the Eastern States produced 11,000 barrels a day less than the markets would readily have absorbed, while the Rocky Mountain states underproduced to the extent of 12,000 barrels daily.

Texas averaged 1,404,300 barrels daily, about the same as in the previous week and 22,000 barrels more than market demand. California output was down 17,000 barrels to 621,700 daily but exceeded demand about 24,000 barrels a day. Kansas cut back slightly and exceeded demand only 3000 barrels daily. New Mexico increased a little but practically conformed with demand.

Oklahoma, like Illinois, Michigan, the Eastern States, Indiana, Kentucky, and the Rocky Mountain states, produced less than the markets would have absorbed. The Oklahoma output averaged 413,625 barrels daily, about 2000 more than in the previous week but 27,000 less than indicated market demand.

### *Stanolind Using 151 Miles of Pipe to Loop Oil System*

Stanolind Pipe Line Company is looping oil lines in Southern Oklahoma to permit segregation of two grades of oil. In Oklahoma, Kansas, Texas and Missouri, work is progressing on 151 miles of new line.

From Wynnewood Junction, Garvin County, Oklahoma, to the county line, 8.35 miles of 12-inch is being used; from south bank of Canadian River to Junction City, 26 miles of 8-inch; Wynnewood Junction to Fox Junction, 18 miles of 12-inch; Fox Junction to Healdton Station, 9.64 miles of 12 inch and Healdton Station to Rogers Junction, 31 miles of 8 inch.

In Kansas, between Independence Wye Junction and Sycamore Station, 4.87 miles of 12-inch is being laid, and from Sycamore Station to Renn Station, 7.22 miles of 12-inch line.

In Texas, from Ore Junction to Lone Jack Junction, the company is constructing 10.10 miles of 12-inch, and from Odessa Wye Junction to Page City Junction, 13.18 miles of 10-inch line. From Carrollton, Missouri, to Mendon Wye Junction, 22.73 miles of 12-inch is being laid.

### *Award Contract for 88-Mile Gas Line in Kansas*

Natural Gas Pipe Line Company of America has awarded construction contract to W. A. Bechtel Company for 88 miles of 26-inch gas pipe line from Meade to Kinsley, Kansas.

This line will parallel the company's existing gas line from a point north of Amarillo, Texas, northeast to its terminus at Chicago. Meade is in Meade County, while Kinsley is the county seat of Edwards County, Kansas.

### *Michigan Paves Way to Extend Compact Membership*

Renewal of Michigan's membership in the Interstate Oil Compact commission last week waited action by Governor Van Wagoner. A resolution for membership renewal was passed by both branches of the legislature, and the governor's approval was expected.

# World-Wide Developments

### *New Jersey Standard Denies Venezuelan Pipe Line Rumor*

Reports that Standard Oil Company of New Jersey's western Venezuelan subsidiary had appropriated $18,000,000 to be spent on a pipe line and in development work, were declared to be without fundation by officials of the Standard Oil Company of New Jersey Friday.

The report current said that $11,000,000 would be spent in building a 24-inch pipe line from Cabimas to a point on the Caribbean, and that $7,000,000 would be spent on development work on Lake Maracaibo. Officials said that the entire report was without basis.

### *Bolivian Head Noncommittal On Expropriation Question*

During an interview at La Paz, Bolivia, last week, President Enrique Penaranda was noncommittal with respect to reopening issues involved in the controversy between the Bolivian government and Standard Oil Company of Bolivia culminating in expropriation of the company's properties in 1937. On the other hand, he displayed receptiveness toward the idea of new American capital entering the country.

Penaranda declared the decision of the Bolivian supreme court in the expropriation case, and the subsequent failure of the Bolivian government to reconsider the issues, do not signify a policy of hostility toward American investment in general. Possessed of great natural resources, his country, he said, is in need of capital for their development. Laying emphasis on the constitutional character of his regime, Penaranda asserted foreign capital entering the country would receive full protection under the laws. He indicated that resumption of Bolivia's servicing on dollar loans totaling around $100,000,000 would be dependent to a certain extent upon increased foreign investment and consequent improvements in Bolivian in-

## Wilson Sees Eastern Shortage Unless "Bottleneck" Removed

[*Continued from page 9*]

from Gulf ports or the Dutch West Indies to North Atlantic ports, where British tankers will pick them up.

"The Martime Commission has recently arranged for the building of several new ways to be devoted solely to tanker construction. This will result in the construction, in one large shipbuilding plant, of about four new tankers per month beginning around next December and should relieve the situation by the summer of 1942 unless sinkings occur at an excessive rate.

"The industry is cooperating with the Office of Production Management in studying all possible ways of improving the efficiency of the existing tanker fleet and of developing all reasonable alternative methods of transportation to the East Coast.

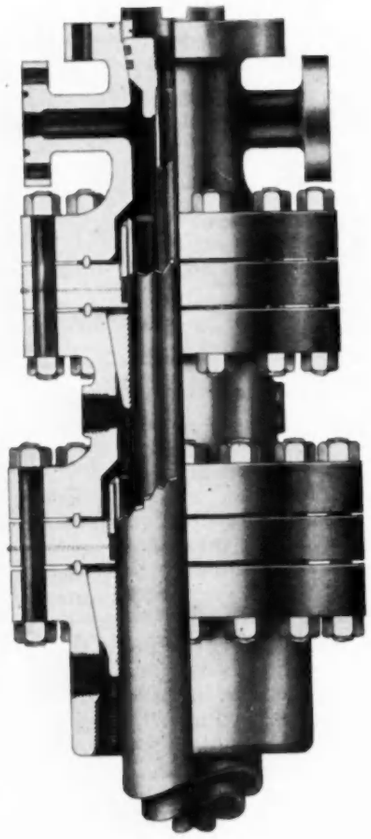
"Some existing pipe lines, which have been little used in recent years to transport crude oil to East Coast refineries, are immediately being stepped up to capacity, and steps are under way to increase this capacity substantially. Serious consideration is being given to several major pipe-line projects to augment East Coast supplies.

"Barge transportation facilities are being expanded, and it is hoped that other barges can be transferred to service up the Ohio River as a means of getting more petroleum products into seaboard states.

"For six months we have been urging that clearance be given to permit the construction of two gasoline pipe lines into Southeastern states, which private capital was willing to construct if the necessary rights-of-way could be secured under the railroads. It seems inconceivable to me that one interstate carrier which employed the right of eminent domain to secure its own right-of-way should be permitted to use that right-of-way to block a competing interstate carrier. It is equally difficult to understand how the Georgia legislature could turn down the request of the President plus the Secretaries of War, Navy, and the Interior, urging that enabling legislation be passed to make possible the prompt construction of these facilities which are so important under the emergency conditions we are facing. While we are still hopeful that this situation will be cleared up in the near future, several months' delay already incurred is irreparable.

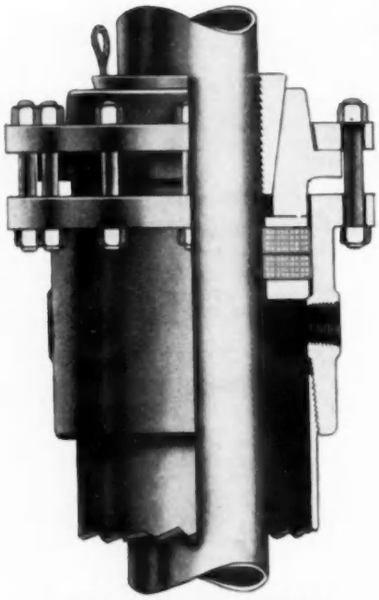
"In spite of everything that can be done this summer it will be very difficult to get the desired volume of petroleum products into the East Coast territory, especially if any further diversion of tankers is found necessary. It is significant that Standard Oil Company of New Jersey has just announced that it is putting its East Coast refinery on a coal-burning basis."

# Around the world you'll find BREWSTER HEADS

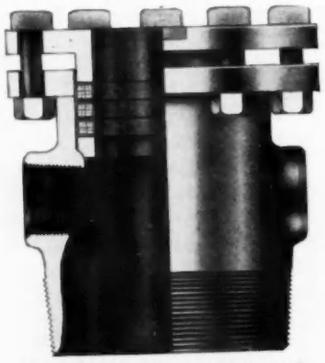


**BREWSTER WT ASSEMBLY**

**This assembly is a good example of what can be done with stock Brewster flanged sections. The Tubing Head is a Brewster Type W with a flanged midsection connecting the Type SLT Casing Head. The strings of suspended casing are supported by slips and may be welded to the center flanges, with all stress relieved by utilizing Brewster's expansion joint principle. Two sizes are available with test pressures of 6,000 and 10,000 lbs.**



**BREWSTER TYPE B CASING HEAD**
**4000, 6000 Pound Tests**



**BREWSTER TYPE LE**
***(Louisiana Pattern)***
**CASING HEAD**
**1000 and 2000 Pound Tests**

# The BREWSTER CO., Inc.

**SHREVEPORT, LOUISIANA, U.S.A.**

***Branch Stores at New Iberia and Houma***


dustry, so that government revenues would rise.

New interest in the Bolivian oil issue arose two weeks ago when Dr. Carlos Salamanca, member of the Bolivian congress, visited Washington after intimating that he might discuss the subject while at the capital.

## *American Oil Workers in Iraq Moved to Safer Points*

American oil men and their families stationed at dangerous points in Iraq have been moved to safer points. Authoritative sources declared last week that women and children, including those of British nationality, were moved on May 2 out of Iraq and into Haifa, Palestine, 500 miles southwest of the Mosul oil fields.

American and British employes of the British Oil Development Company, an Iraq Petroleum Company affiliate, were moved several weeks ago to the British consulate at Mosul, 70 miles inside the northern border between Iraq and Turkey. It is considered probable that these evacuees constitute the majority of the Americans resident in Iraq.

A press dispatch from Washington last week declared 160 British and Americans were concentrated for protection in the United States legation at Baghdad, Iraq. The British embassy is housing additional Britons.

## *Richmond Plans Shallow Tests In Magdalena Valley, Colombia*

Richmond Petroleum Company is preparing to put down several shallow tests on its property near the town of San Pablo in the Magdalena River valley of Colombia. Location will be on the west side of the river. The company is building a terminal camp and roads, and expects to begin drilling in a few months.

## *Standard Places Orders for Portland-Montreal Line Pipe*

Standard Oil Company (New Jersey) last week confirmed reports it is planning construction of a 12-inch pipe line from Portland, Maine, to Montreal, Canada.

The company announced it was proceeding with aerial surveys and purchase of rights-of-way along the proposed route. Orders for the pipe have already been placed with the Youngstown Sheet & Tube Company and with Spang Chalfant Company.

The main line will be 250 miles long and will have a capacity of 50,000 barrels of crude oil daily, with a maximum capacity in summer months of 60,000 barrels daily.

Crude oil from Gulf Coast and South American fields will be delivered by tanker to a marine terminal at Portland, from where the pipe line will take it to Montreal for distribution to several refineries in that area. The project is designed primarily to insure deliveries of oil supplies to Canada in view of the growing tanker shortage arising out of the recent transfer of these carriers to the Maritime Commission.

The pipe-line shortcut will save about one-third of the normal tanker voyage from Gulf ports to Montreal. In addition to the longer haul at present, tankers are unable to make deliveries up the St. Lawrence River during certain winter months.

# U. S. FIELD OPERATIONS

## Illinois-Indiana

### *Louden Gets Substantial Devonian Oil Well*

Substantial Devonian production in the Loudon field of Fayette County was assured when Whisenant & Trenchard's Henry Lilly 25-D, NW NE 16-8n-3e, flowed 681 barrels in 8-1/3 hours under 5/8-inch choke through casing set at 3098 feet. Bottom was slightly below 3100 feet. Oil was 29.6-gravity, as compared with approximately 38 gravity from the field's shallow sand horizons. Production tested only 0.2 percent bs & w.

Three miles south of Lilly 25-D, Jarvis Brothers and Marcell's Sinclair 1-D, another Devonian test, NW NE 29-8n-3e, was having water trouble. The well was swabbing and flowing five to seven barrels an hour, on which about 40 percent was water. Operators were checking casing to determine the source of the water.

The Loudon pool is largest in area in Illinois, extending about 15 miles north and south and from one to three miles east and west. However, in production it still ranks second to the Lake Centralia-Salem pool of Marion County, with 65,000 barrels a day compared with the latter area's 90,000 a day. Devonian development in the Lake field more than a year ago rocketed the area's production to a peak of 290,000 a day, but now many of the wells which were initialed at from 10,000 to 12,000 a day are producing less than 10 barrels.

The Carter Oil Company and independent operators at Loudon have reached an agreement for 20-acre spacing in development of the pool's Devonian horizon. In the Lake field, there was no semblance of spacing in many areas where tiny leases necessitated scores of offsets.

#### Three New Pools

New fields were opened in White, Clay and Richland Counties.

The White County discovery, Sackett et al's Ellis 1, NE SW SE 11-7s-8e, four miles southeast of the New Haven pool, blew in from Waltersburg sand at 2145-60 feet and flowed a brief time before it was shut in for storage. Estimates of initial production ranged as high as 600 barrels, although it is probably the test will not be completed for several days.

In Clay County, Carl Robinson's Tolliver 1, SW NW SE 26-4n-7e, was swabbing oil from Tar Springs at 2315-35 feet. It is the first production from the Tar Springs in the county, although the horizon has paid off substantially in other areas of the Illinois basin.

Paul Osborn's M. E. Bowers 1, SW SW SE 34-3n-14w, 10 miles from production in Richland County, swabbed and flowed 300 barrels of oil and 140 barrels of water in 24 hours from McClosky pay at 3118-24 feet. The test was to be put on the pump without an acid treatment.

Jackson County's first field was assured with near completion of Wiser Oil Company's Overholt 1, 10 miles northeast of Murphysboro, SE SW 22-7s-1w, which was swabbing oil at the rate of four to five barrels an hour from Benoist sand at 1999 feet. Observers estimated the well would make from 75 to 100 barrels a day on pump.

Hudson-Hess' Ben Young 1, SW SW SW 7-2n-2e, Marion County wildcat a mile east of Odin and about two miles north and west of the Lake Centralia-Salem pool, was running electric log at 3585 feet after recovering 8½ feet of broken saturation in the Devonian in a core at 3520-33. The core was bleeding in spots, but it appeared improbable that the saturated area was sufficient for commercial production. The test also encountered 20 feet of promising saturation in the Cypress at 1745 feet, a formation which is not productive in the Lake field.

Another Marion County wildcat, Paul Doran's W. Ververs 1, NE SE NE 6-3n-1e, between the Fairman and patoka fields, was drilling at 1298 feet after topping the Glen Dean at 1160 feet, about 30 feet low. V. Hollingsworth's Mason 1, NW NE NE 19-3n-1e, was abandoned at 1523 feet. Benoist was topped at 1508 feet, and was shaly. Still another wildcat in the area, W. T. Rice's Teschner 1, SE NW SW 27-3n-1e, was drilling below 1300 feet.

In Saline County, Thompson Drilling Company's Carter 1, NW NE SE 17-8s-7e, was shut down after testing water and only a light show of oil after a 40-quart shot in Tar Springs at 2224-62 feet. It is possible that the well may be deepened. There is no production in the county.

A Gallatin County wildcat, Ryan Oil Company's H. Crunk 1, NE NW SE 9-8s-9e, was shut down on orders with a hole full of salt water after plug was drilled to test Cypress at 2614-36 feet. This test may also be drilled deeper. It is in wildcat territory.

Jansen & Lynch's Burke 1, Section 27-6n-5e, Mason pool, Effingham County, was testing a show of Benoist oil at 2275-2305 feet. All production in the area at present is from McClosky lime.

A Clinton County wildcat, Jahns Oil Corporation's Sanders 1, SW NW NE 17-3n-1w, north of Boulder, was shut down on orders at 1390 feet. Benoist sand was topped at 1384 feet, but shaled out.

First test in many months for Plum Hill township, Washington County, was Smith Petroleum Company's William Mittehdorf 1, SW SE 8-2s-4w, drilling below 700 feet. There is no production in the township.

### *Posey County Wildcat Among Week's New Starts*

Sam Yingling, Evansville, located J. V. Welborn 1, SE NE NW 34-5s-14w, Posey County wildcat in Lynn Township. A Carter Oil Company farmout, it is ½ mile west of the latter company's Elva Stallings 1, NE NE SE 35-5s-14w, abandoned at 1441 feet. Stallings 1 set casing on shoulder to test Pennsylvanian sand show at 1419-41 feet. Following 20-quart shot at 1432-41 feet, test baled 18 barrels of water and ½ barrel of oil in one hour.

Gulf Refining Company's M. E. Downen 1, SW NW NE 26-6s-13w, was a new start in the Bufkin area of Black Township, Posey County, just north of Dirickson et al's Elza Utley 1, now testing after cement squeeze job to shut off water in Cypress sand.

Gulf Refining Company plugged two other Posey County failures: Levin Blackburn 1, NE NE SE 23-6s-13w, tested only salt water in Degonia at 1628-44 feet, after plugging back from a dry McClosky at 2910 feet, and Fred Roehr 1, SE SW NE 18-6s-12w, north of Caborn field production in Marrs Township, failed to get a commercial well on a Pennsylvanian-sand test at 725-38 feet, after plugging back from 1166 feet.

A mile northeast of Griffin, Posey County, Mahutska Oil Company (A. U. McCandless et al) located Ed Holmans 1, NW SW NW 5-4s-13w.

Abandoned through the McClosky at 1314 feet was Continental Oil Company's Herman Schroeder 1, NW NW SE 34-6n-8w, Sullivan County wildcat north of Freedlandsville. Ste. Genevieve series was topped at 1180 feet, and McClosky break at 1273-81 feet was dry.

In the Caborn field of Marrs Township, Posey County, Lelalu-Myles' Sophia Dickhaut 1, NW SW NE 19-6s-12w, was completed in Cypress pay at 2356-70 feet for 73 barrels on pump in 24 hours.

In the Huesler Dome field of Marrs Township, Posey County, R. B. Creager's Reis 1, SW SW NE 1-7s-12w, Sun Oil Company farmout, was testing a fair show in Tar Springs sand at 1915-25 feet. Hole is bottomed at 1947 feet. Test is midway between two Waltersburg sand producers, but, starting at surface elevation of 454 feet, the Waltersburg formation at 1784-1848 feet was dry.

On the west edge of the Griffin field of Gibson County, W. C. McBride, Inc.'s Jesse Blood 2, NE SE NE 28-3s-14w, swabbed 152 barrels of oil and no water in 22 hours after 2000 gallons of acid in McClosky.

## Nebraska-Iowa

### *Gage County Wildcat to Test Hunton and Viola Limes*

Walt Rider et al will test a wildcat in Gage County, Nebraska, for possible production in Hunton and Viola limes. Warren 1, C NE NE 21-3n-5e, ran electric log to 2858 feet. Results showed gas at 1885 feet, top Hunton at 1930 feet with a show of gas and oil at 2000-20 feet, some saturation at 2535-40 feet, top Viola lime 2565 feet, with saturation at 2605-30 feet. Decorah shale was topped at 2680 feet, St. Peter (Wilcox sand) 2753 feet, Pre-Cambrian 2820 feet, and hole was bottomed at 2858 feet. Operators will cement

pipe at 2675 feet and perforate opposite shows.

Uhri Oil Corporation's Ogle 1-A, NW SE SE 9-1n-14e, abandoned Dawson pool area, reacidized Hunton lime at 2258 feet with 200 gallons, and treated with 500 gallons of butane before testing. There was 250 feet of oil in the hole.

Eight miles northwest of Ogle 1-A, J. E. Palensky et al's Kalous 2, SWc 5-2n-13e, topped Lansing lime at 473 feet and was coring below 1135 feet. National Petroleum Company's Oswald 1, C NW SW 15-2n-14e, five miles north of Dawson area, plugged back to 2623 feet in Hunton lime, and hole filled 12 barrels with oil and 15 barrels of water.

Two new wildcats were staked. Midland Oil Company et al had surface hole at Gebhard 1, NEc 1-2n-15e, seven miles north of Falls City pool, and Helmerich & Payne et al were drilling below 2900 feet at Leising 1, C SE 14-3n-23w, Furnas County. The latter wildcat is supported by Stanolind Oil & Gas Company and Barnsdall Oil Company. Objective is Arbuckle lime.

Ebke et al's Mathies 1, NEc 22-5n-1w, cemented 5-inch casing at 3300 feet and stopped work at 3831 feet.

Zimmer et al's Roddy Estate 1, C S½ SE SW 31-9n-14e, north of Nebraska City, Otoe County, Nebraska, topped Simpson at 2320 feet, St. Peter 2395 feet, filled with water at 2395 feet, and was abandoned in Arbuckle lime at 2484-2500 feet.

L. H. Hough et al's Timm 1, C W½ SW SE 15-13n-12e, was abandoned at 425 feet.

Jackson & Rust et al's Hayes 1, C NE NE 22-66n-42w, northwestern corner of Atchison County, Missouri, and immediately bordering Iowa and Nebraska, was plugged in dry Arbuckle lime at 3236-89 feet. Log disclosed Hunton at 2092 feet, Sylvan 2750 feet, Viola 2797 feet, and St. Peter 3200 feet.

Thorsen & Pebley et al's Grant 1, C SE SE 23-62n-40w, northwestern Holt County, Missouri, and northeast of Falls City pool, logged Lansing at 607 feet, Mississippi 1898-2109 feet, Hematite 2120 feet, Hunton 2310 feet and was abandoned at 2360 feet. Robert Wells & Son plugged Withers 1, SWc SE 28-55n-28w, northeast of gas production in Caldwell County, at 420 feet.

In Iowa, Pryor & Lockhart and Stanolind Oil & Gas Company's Marr Estate 1, C E½ NE SW 32-68n-35w, Taylor County, topped Arbuckle lime at 2882 feet, filled with water at 2889 feet, and was plugged at 2896 feet.

Three tests were active in Shubert pool, Richardson County, Nebraska, all drilled by Black-Gold Operating Company. Watkins 1, C SE SE 30-3n-16e, was below 2500 feet; Schaible 1, C SE NE 31-3n-16e, was testing below 2520 feet, and rig was up at Watkins "B" 1, C NE NW 31-3n-16e.

## *Form Company for Cycling Plant in Francitas Field*

H. B. Zachry, San Antonio, has formed Francitas Gas Company to construct a recycling plant in the Francitas field of Jackson County. The plant will have a capacity of 60,000,000 feet of gas per day, and will return 53,000,000 feet of that amount to the formation. The concern also has plans for a pipe line project, but details have not been announced. General headquarters will be at 308 Second National Bank Building in Houston.

# Oklahoma-Kansas

## *Pottawatomie County Viola Strike Flows 513 Barrels*

J. E. Crosbie and Atlantic Refining Company's Viola lime discovery three miles southeast of Tecumseh Lake pool, Pottawatomie County, flowed 513 barrels of 35-gravity oil with no water in 24 hours through 1-inch tubing choke. No gauge has been taken on the gas, which is estimated around 1,000,000 feet. Viola lime, topped at 4582 feet, was perforated with 53 shots at 4580-4632 feet and treated with 1000 gallons of acid. Hole was drilled to 4722 feet in watery Second Wilcox sand and plugged back to 4651½ feet.

Bill Smith opened a new gas pool at Johnston 1, SE NE NE 22-10n-11e, one mile east of Weleetka, Okfuskee County. From sand at 2348-2410 feet, the wildcat was completed for 4,000,000 feet of gas. Rock pressure was 700 pounds.

Skelly Oil Company has moved in a 10,000-pound test Christmas tree assembly before testing a deep test in the Velma pool. This well-head connection was brought in from Texas, and is the largest ever assembled in Oklahoma. Formation dip at 7730-48 feet measured 53 degrees, while at bottom increased to 57 degrees.

Skelly Oil Company and Selby Oil & Gas Company cemented 5½-inch casing at 7791 feet at Frensley 4, C NE NE 35-1s-5w, deep test in shallow Velma pool, Stephens County. Tulip Creek was logged at 7693-7730 feet, and hole was bottomed at 7797 feet. Pipe will be perforated at 7142-94 feet in Bromide sand, topped at 7124 feet. On previous drill-stem test at this depth with packer at 7142 feet, this wildcat was estimated at 50 to 100 barrels per hour.

C. S. Miller et al extended Kasishke pool, Osage County, ½ mile northeast at Osage 2, SW NE SW NE 18-24n-8e, pumping 100 barrels of 41-gravity oil in 24 hours. Pay is Hominy-Wilcox sand, shot with 15 quarts at 2835-45 feet. This semi-wildcat logged Big Lime at 1999-2058 feet, Oswego 2161-2210 feet, Pink lime 2377-86 feet, Mississippi Chat 2523-36 feet, Hominy Wilcox 2796-2847 feet. Plug was set at 2845 feet.

Gled Oil Company completed the initial gas producer in Hobart pool, Kiowa County at Watkins 4, SE SW NW 20-7n-17w, flowing 20,000,000 feet in 24 hours. Lime was topped at 945 feet and penetrated to 1150 feet. After plugging back to 1122 feet, lime was treated with 1500 gallons of acid.

### Wilcox at North Cromwell

Shell Oil Company completed a Wilcox-sand discovery in the North Cromwell pool, Okfuskee County, at J. T. Smith 1, SW SE SW 26-11n-8e, flowing 145 barrels of 37-gravity oil with 16 barrels of water in 22 hours through casing. Gas gauged 2,000,000 feet. Second Wilcox sand was topped at 4224 feet, and drilled to 4242 feet. With plug set at 4237 feet, pay was shot with 33 quarts. Last flowing test through tubing gauged 90 barrels of oil and 30 barrels of water.

H. J. Brown opened a small producing area in Loco district, Stephens County, at Lowery 2, NW SW NW 8-3s-5w, northwest edge of shallow production. In sandy lime at 1113-34 feet, the wildcat bailed 12 barrels per day. Arbuckle lime at 1814-56 feet was dry and hole was plugged to 1160 feet.

Ramsey Petroleum Corporation's Harryman 1, C W½ SE NW 27-2n-9e, north extension test for Centrahoma pool, Coal County, gauged 6,000,000 feet of wet gas, with shut-in casing pressure of 1170 pounds, from perforations at 4848-80 feet. Between 4790 and 4862½ feet, an additional 108 perforations brought in a spray of water estimated at eight barrels. No distillate showed in last perforations at 4830-62½ feet.

B. L. Cromwell et al's Turner-Lucas 1, SWc NW 13-9n-9e, 1½ miles south of Papoose pool, Hughes County, was abandoned at 3382 feet in Cromwell sand when hole filled with salt water. Northwest of this failure, Mid-Continent Petroleum Corporation's Felix 1, SE SW SW 11-9n-9e, based Cromwell sand at 3520 feet, and was rotating toward Wilcox sand, expected around 4150 feet.

Mico Oil & Gas Company was making surface hole at Kidd 1, NE SW SE 33-10n-8e, ¾ mile south of Davis 1, NEc 33-10n-8e, which filled 2200 feet with water when deepened to 3531 feet in Cromwell sand. Hole was abandoned when additional testing up the hole brought in salt water with only a small show of gas.

## *Lansing Opened in Davidson Pool by 500-Barrel Well*

H. H. Blair et al opened initial Lansing lime production in Davidson pool, Barton County, at Peirano 1, C N½ NE NE 4-16-11w, pumping and flowing 500 barrels of 40.9-gravity oil in 24 hours. Lansing lime was topped at 2930 feet, pay logged at 3016-20 feet and treated with 4000 gallons of acid. Original production was Arbuckle lime around 3415 feet. Northeast Davidson produces from Arbuckle lime.

Magnolia Petroleum Company extended Kraft pool at Grossardt 1, C N½ NW SW 9-17-11w, Barton County, pumping 45 barrels per day on completion test from Arbuckle lime at 3279-3300 feet, acidized with 8000 gallons. J. E. Crosbie et al's Buckle 1, C N½ NE NE 16-24-11w, extension for Zenith pool, Stafford County, pumped 240 barrels of oil in 24 hours with a small show of water. Viola lime was topped at 3809 feet and drilled to 3331 feet. After plugging back to 3838½ feet, lime was treated with 6000 gallons of acid.

Stanolind Oil & Gas Company's Karbar 1, C N½ SW SE 5-16-1w, ten miles north of Roxbury pool, Saline County, was disappointing in Mississippi Chat, showing only mud on two drill-stem tests at 2670-77 and 2685-90 feet. Top was marked at 2668 feet, and good porosity and fair saturation was cored to 2697 feet. Operators were deepening below 2950 feet to test Arbuckle dolomite.

Aladdin Petroleum Corporation's Reschke 1, C W½ SW SW 18-27-13w, four miles southwest of Iuka pool, Pratt County, based Kansas City at 4223 feet, topped Mississippi 4335 feet, Cherty Viola 4383 feet, Simpson 4496

feet, Arbuckle 4572 feet and began coring at 4574 feet.

Stanolind Oil & Gas Company will make a third attempt for commercial production on a large block in Kearny County. Location was staked for Patterson 1, C E½ SE SE 23-22-38w, 25 miles west of Nunn pool and the same distance northwest of Holcomb gas pool.

Allison and Phillips Petroleum Company moved in machine to spud Porter 1, NW NE NW 25-28-8e, three miles southeast of Shambusch pool, Elk County. Miller et al had cellar and pits for Tonkinson 1, C W½ SW NW 17-33-6e, southwest of Frog Hollow pool, Cowley County. Marylyn Oil Company spudded Mosier 1, NEc SE 20-34-7e, four miles northeast of Maple City, Cowley County.

Helmerich & Payne et al staked Loyd 1, C S½ SE SE 6-4-17w, two miles southeast of Phillipsburg, Phillips County. In Brown County, McAlpine et al's Tyler 1, NE SW SW 4-3s-15e, was drilling below 1200 feet. In adjoining Nemaha County, Bumpus et al's Achten 1, C S½ SE NW 12-4s-14e, logged a show of gas in sand at 2287-99 feet and cemented 6-inch casing at 2300 feet. Bit was progressing below 2450 feet.

A. R. Jones et al's Kanz 1, C E½ E½ SE 1-16-14e, three miles north of Osage City, Osage County, suspended operations at 960 feet.

Palm-King Oil Company et al's Steinmetz 1, SEc NE 6-7-21w, Graham County, logged Anhydrite at 1855 feet, Hebner 3430 feet, Lansing 3482 feet and was drilling below 3950 feet. R. W. Shields et al's Waggle 1, C S½ SW SE 28-7-24w, three miles northwest of Penokee pool, Graham County, was abandoned in Arbuckle lime at 4301-33 feet.

Continental Oil Company's Taylor 1, SW SE SW 17-18-6w, ten miles east of Geneseo pool, Rice County, filled with water to be abandoned in Mississippi lime at 3298-3368 feet.

Magnolia Petroleum Company's Conrad 1, C E½ NE SW 33-19-17w, 10 miles southwest of Otis gas field, Rush County, was plugged in Arbuckle dolomite at 3957-4018 feet. Herndon Drilling Company et al's Timbers 1, NWc NE 8-21-8w, an old wildcat plugged back, was plugged after 12 holes at 3348-53 feet in Kinderhook brought in a hole full of water in ½-hour.

Gulf Oil Corporation's Seymore 1, C N½ SW NW 34-21-18w, eleven miles west of Larned, Pawnee County, topped Topeka lime at 3615 feet, and was drilling below 4400 feet.

Winkler-Koch Royalty Company et al's Kaufman 1, C E½ NE NE 8-22-1w, south of Garber pool, Harvey County, was abandoned in Arbuckle lime at 3372-3618 feet.

### *Bindel Field Proration Units Set at 10 Acres*

An order issued by the Texas Railroad Commission last week calls for 10-acre proration units in the Bindel field, Cooke County. Wells may be drilled 150 feet from lease lines and 300 feet apart. Proration is on acreage and per-well with 50 percent allocated on each factor.

Rules require a 60-foot conductor string for surface casing, and oil string cemented 500 feet above the shoe.

# North and West Texas

### *Two Good Wells Bring Abell Completions to Eight*

Two prolific completions were recorded in the Abell pool, northern Pecos County, making eight wells on production from the Simpson zones. Sinclair Prairie Oil Company's Daly 1, an inside test, earned potential rating of 2350 barrels of 43.6-gravity oil via ½-inch choke with gas/oil ratio of 933/1. Main pay is from sand at 5359-68 feet, with elevation of 2393 feet. Top of Simpson was called at 4760 feet, and Tulip Creek at 5025 feet. The well flowed 305.8 barrels and 293.7 barrels on two consecutive 3-hour periods. Magnolia Petroleum Company's Markey 1-B, northwest offset to the discovery, flowed 204 barrels and 190 barrels of 43-gravity oil on similar test through ½-inch choke to earn potential of 1520 barrels. Production is from lower sand member of the McKee zone at 5418-24 feet, with elevation of 2394 feet. Top of Simpson was called at 4845 feet and Tulip Creek at 5070 feet.

Expansion of the field to the east was assured by George Abell et al's Rixse 1, southeast corner Lot 8, H&GN Section 25, with the well flowing oil, gas and wash water late last week while testing at 4997 feet, with elevation of 2382 feet. Salt water was encountered in attempting to complete at 5043 feet, where swabbing test failed to lower the fluid level below 500 feet from top. This exceptionally high outpost proves an irregular water table prevails, and that local fractures and minor faults are present. Rixse 1 logged top of Simpson at 4850 feet, and caught short section of Tulip Creek. Sinclair Prairie Oil Company's Grove 1, Lot 9, Section 26, 1¼ miles southeast of the above test and same distance east by north of production, is also high on structure, having entered Simpson and Tulip Creek at 4820 and 5095 feet, respectively, with elevation of 2392 feet. Top of McKee sand was logged at 5413 feet, and no appreciable shows had been encountered in coring to 5447 feet.

Magnolia Petroleum Company's McKee 1, Lot 13 and east offset to Rixse 1, showed 3,142,000 feet of gas with distillate on drill-stem test in McKee sand at 4969-75 feet, and was due to make another drill-stem test at 5000 feet. The company's Gerty 1, northwest outpost, logged Simpson and Tulip Creek markers at 4895 and 4950 feet, respectively, with elevation of 2396 feet. Drill-stem test at 5273-84 feet yielded small volume of gas, and the test was coring at 5290 feet. Stanolind Oil & Gas Company's Conry-Davis 1, four miles southeast of production, was drilling hard dolomite at 5345 feet in Ellenberger, topped at 4825 feet with elevation of 2376 feet. The Simpson zone was not present, although it has a thickness of 1327 feet in the Abell pool.

The Abell area is in its early stage of development, and progress on outposts is being followed closely by lease owners as well as drilling contractors and supply houses. The area currently has 16 active tests, including nine on Magnolia Petroleum Company's leases, and seven locations and derricks. Possibly two pipe lines will enter the pool. Magnolia Company is installing six miles of 4- and 6-inch crude gathering lines to tie into its 80,000-barrel tank on the Markey tract, and is due to discontinue tank truck shipments of crude to its Halley tank farm, Winkler County, by end of May. Sinclair Prairie Oil Marketing Company's representatives have canvassed operators to determine number of wells that could be counted upon to supply oil in the event The Texas-New Mexico Pipe Line Company builds an extension line from eastern Crane County.

Grisham and Delaney's Cowden 1, North Goldsmith pool, Ector County, recovered 105 barrels of oil on 18-hour test, including accumulation during shutdown, after reacidizing broken pay at 6240-6431 feet with 7000 gallons of acid. It may be deepened to try for a flowing producer, as the gas volume is not ample to cause the well to flow. Phillips Petroleum Company's University-Andrews 1, Andrews County semi-wildcat, was drilling lime at 7945 feet.

Exploration of the Lower Permian and possibly the Ordovician series is to be made by Magnolia Petroleum Company's Walton-State 20, C NW NW PSL Section 4, Block B-3, Winkler County semi-wildcat between the Keystone and Hendrick fields. String of 9⅝-inch pipe was landed at 3676 feet to exclude gas passed up in the regular Permian zones. The company holds lease on 8000 acres of the Walton ranch, and such a test has been under consideration for some years.

O'Neal Drilling Company's Wright 1, eastern Cochran County wildcat and 3½ miles north by west of nearest Slaughter field production, set 5½-inch pipe at 4940 feet, with the hole bottomed at 4983 feet in water sand. Oil saturation passed up in the upper lime gives promise of yielding a small well. Magnolia Petroleum Company's Maple Wilson 2, southwest corner of Labor 10, League 41, northeast outpost for the Hockley County portion of the Slaughter field, was drilling gray lime at 5440 feet after failing to indicate commercial production in the regular lime. Base of brown porous lime was called at 5390 feet. It may be deepened to the equivalent of the Clear Fork, of Holt lime pay.

### *Two Strikes Speed Search For Deep Producing Zones*

The search for deep producing zones in North Texas areas gained momentum through completion of a prolific Mississippian lime well in the Antelope pool, southwestern Clay County, and proving of the Ellenberger dolomite in the Bindel 2-well pool, western Cooke County. Both pays are responsible for a sharp upturn in drilling activity elsewhere in the district.

Shell Oil Company's H. Henderson 9, offsetting Strawn production in the west portion of the Antelope pool, flowed 266 barrels of pipe-line oil in 1-5/6 hours after using 2000 gallons of acid through casing perforation at 5715-60 feet, and opposite Mississippian topped at 5622 feet. Comparatively little free oil appeared before using acid, which was injected at pressure ranging from 2100 to 900 pounds. Henderson 9 is the first deep test for the pool, which is at present confined to the discovery block with

24 flowing wells in the 3100-foot and two in 3500-foot Strawn sands. Nominal saturation was passed up in the Bend series, topped at 4988 feet, but the Ellenberger zone at 5975-6100 feet was barren. The nearest sub-Strawn test for the area involves Deep Rock Oil Corporation's Dycus 1, 1¾ miles west, and it was abandoned last August in shale at 5702 feet after entering Bend at 5105 feet, being 77 feet low when correlated with Henderson 9. An effort may be made to deepen the latter.

The Texas Company's Fleitman 1, west offset to its Bindel pool 1900-foot Strawn pumper, missed the discovery sand and logged saturation in Ellenberger dolomite at 3237-46 feet. Formation tester used at this level yielded 220 feet of oil and 66 feet of oil-cut mud with good gas flow. Pipe was run on top of the lime to complete. The area is on the west flank of the Ellenberger ridge that extends southeast from the Bulcher field via Muenster and beyond the Voth pool into Denton County. It is midway between the Bulcher and Voth areas, both of which have Ellenberger producers near the 1400-1600-foot level. Comparatively few wells in the Bulcher field produce from the dolomite, but the crude yield per acre has been exceptionally high. Sinclair Prairie Oil Company, owner of considerable acreage within the prospective area, has started Joe Dangelmayer 1, offsetting production. A revival of wildcat development has been underway for several weeks in western Cooke County, with one active test inside the Montague County line.

Authorization of four new tests by L. T. Burns et al immediately east and west of their recent Mississippian oil discovery in the Larimore area, north central Young County, makes a total of seven operations scheduled. Heretofore, operators have been somewhat cautious in launching such an ambitious drilling campaign around a single producer. The Mississippian affords less performance history than any of the deep zones in the district, as it is comparatively new except for small pools in Young County. Shell Oil Company's Bloodworth 1-A, north offset to the Larimore 4927-foot discovery, was drilling at 3630 feet, and should be the next completion.

Shell Oil Company has fared better than any other large-scale operator in developing deep production in the district. The company is starting a 5-well program offsetting its recent Mississippian strike on the E. D. Coleman tract, eastern Clay County. The discovery logged about 150 feet of broken saturation in Mississippian topped at 6126 feet, indicating a worthwhile pool has been found. Sinclair Prairie Oil Company has staked three offsets to its recent Montague County discovery on the Clingingsmith tract, which produces from lower Pennsylvanian, possibly Marble Falls, at 6119-31 feet. This company has likewise been successful in finding new pools in the east portion of the district. Hults & Owens' Summers 1, north offset to their Bend lime strike in western Montague County, was drilling at 7080 feet with the Ordovician as its next objective.

### K-M-A Extension Test

King Oil Company, Perkins & Cullum's Birk 1, Block 23, J. A. Ventress Survey, was showing for a 2¼-mile east extension for the K-M-A field, having set pipe at 3995 feet to test favorable oil saturation in Strawn sandy-lime at 4005-29 feet. Top of lime was called at 3860 feet, being level with nearest producers. The Strawn beds flatten out on the east side of the district's largest field, and porosity is a factor in its ability to produce, thus accounting for an occasional large well near submarginal pumpers. The above test was scheduled to drill to the Ellenberger, but the show in the regular pay caused owners to try for a completion.

Shell Oil Company and Phillips Petroleum Company's Griffin 22-E, northeast corner of 860-acre lease and in the prolific sector of the K-M-A field's Ellenberger zone, flowed 498 barrels oil natural in four hours, then gauged 269 barrels in 2½ hours through ¾-inch choke. Production is from dolomite saturation at 4288-4342 feet, with the hole bottomed in lime and pyrites at 4386 feet. Top of Ellenberger was called at 4270 feet. Jack Kadane et al's Bradley 1, M. L. Gahagan Survey and 1½ miles east of nearest deep production, failed to respond to acid treatment of promising saturation in Ellenberger section at 4345-60 feet. Top of Ellenberger is 170 feet low when correlated with nearest producer.

Bridwell Oil Company's Myers 2, second deep test on 1800-acre lease, Clay County, tested dry when drill stem was run at 5780-96 feet in Bend, topped at 5581 feet, or 11 feet low. Drilling was resumed to explore the Mississippian near the 6000-foot level. Myers 1 is due to be worked over after developing oil and gas while capped at 6065 feet. Source of the oil has not been fixed. Two failures were credited to eastern Archer County, and one across the line in Clay County. L. T. Burns et al's Wines 1, Clay County semi-wildcat, quit in Bend at 5432-5500 feet. Bass & Dillard's McGregor 1, 3 miles southeast of the Vogtsberger pool, quit in barren Ellenberger at 5500-5693 feet, having topped Bend at 5255 feet and Mississippian at 5473 feet. Geo. W. Cooper et al's Edward 1, two miles northwest Scotland, quit in Bend at 5290-5324 feet.

Kadane & Fidel's Orr 1, south offset to the Harrold pool, Wilbarger County discovery well, missed the upper pay, showed oil sand at 3199-3202 feet, and was drilling dry sand at 3210 feet. It was due to continue to the 3280-foot pay. In the Fargo pool, Amerada Petroleum Corporation's Goodpasture 2-B, northeast outpost, flowed 124 barrels oil on 3-hour gauge through ½-inch choke from Basal Canyon at 4007-21 feet, with the hole bottomed at 4030 feet in shale.

## *Texas Permits*

Permits for drilling 357 wells in Texas were approved last week by the Texas Railroad Commission, 316 more than were authorized the week before.

There were 15 locations reported from the East Central Texas area, while six were listed from Gregg County in the East Texas field.

Leading the state was Southwest Texas with 147 permits, including 105 in Starr, and 10 in San Patricio County. Gulf Coast producers were allowed to drill 15 wells.

The commission granted 67 permits in West Texas, including 19 in Hockley County, and 28 were reported from West Central Texas. There were 61 locations approved in North Texas, including 17 in Young and 15 in Wichita County, and 18 were granted in the Panhandle.

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# East Texas

### *Rusk County Discovery Has Little Oil With Much Gas*

East Texas accounted for its first discovery for the current year with a Woodbine producer in southwestern Rusk County that is showing for a small volume of 39-gravity oil with an excessive gas yield. Ross Sears and A. O. Phillips' Pool 1, southeast corner of 71-acre lease, George May Survey, 3½ miles south of distillate production in the East Texas field and 5½ miles northeast of the Lone Star four-well pool, Cherokee County. Preliminary test rates the well at 25 to 50 barrels of oil and 3,000,000 feet of gas daily through ¼-inch tubing choke.

Production is from perforations at 4054-62 feet in Woodbine topped at 4043 feet, with elevation of 412 feet. Gas separator was due to be installed late last week to resume testing. The producing zone is 350 feet below the water level in the East Texas field, but is at the same sub-sea depth as the Lone Star pool, which was discovered by Bunn Drilling Company and Chapman Minerals Corporation in April, 1938. Carpenter & Richards, owners of Bowling 1, only active producer in the Lone Star pool, are producing 65 barrels of 36-gravity oil plus 700 barrels of water daily. Arrangements have been made to deliver the output of this well by tank trucks to the Texas Pipe Line Company's station on the south end of the East Texas field. The other wells are due to be reworked since a market for the oil is assured.

Four Woodbine prospects were eliminated the past week. In Cherokee County American - Liberty Oil Company's Austin 1, 3 miles southwest of Ironton, tested water in sand at 4735-48 feet with elevation of 294 feet. The Butler Dome, Freestone County, wildcat of Carter Gragg Oil Company on the Mims tract, found water sand at 5247-54 feet. The Canton faulted structure, Van Zandt County, provided a disappointment when Hickok and Harry Reynolds' Brown 1 found water in sand at 4187 feet, but was drilling at 4300 feet for geological information. Anderson County contributed the other failure along with a prospective distillate discovery and an oil well in the northeast extension of the Long Lake field.

Tex Harvey Oil Company's Cartmel 2, north offset to a recent 6500-foot extension well for the Long Lake area, flowed 406 barrels of oil and 30 barrels of water initial through ⅛-inch choke. Production is from perforations in Woodbine sand at 5390-5405 feet. The latter figure is the oil-water contact. Considerable development is in store for the area as the well allowable is double that of the field proper.

Southwestern Anderson County accounted for a prospective wildcat strike when B. T. Royalties Company (T. B. Slick Jr.) and Housh & Thompson, Inc.'s S. F. Coleman 1, northwest corner of 170-acre tract, J. A. Box Survey No. 10, logged promising saturation in Woodbine section at 5245-5507 feet. Pipe was to be run for a production test. Austin chalk was logged at 4987-5145 feet, with elevation of 292 feet. Location is five miles northeast of Navarro Crossing. Harris-Hawkins et al's Anderson-Clayton Company 1, 1½ miles northwest of Elkhart, was awaiting orders at 6047 feet in Woodbine, topped at 5964 feet with elevation of 475 feet.

Shell Oil Company's I. N. Browning 1, 1740-foot north outpost for the Chapel Hill field, provided an outstanding oil well for the Pettit with initial flow of 933 barrels of 42.3-gravity oil through ⅜-inch choke with gas/oil ratio of 810/1. Casing pressure ranged from 325 to 250 pounds and pressure on tubing dropped from 800 to 625 pounds. The flow followed treatment with 4000 gallons of acid through casing perforations at 8140-70 and 8245-56 feet. It is the ninth oil producer for the field. Chapel Hill Gathering System (H. L. Hunt) provides a market outlet for the area through crude and distillate sales to East Texas refineries. The latter boosted its price to $1.13 and $1.25 per barrel at the well, respectively, on the two products. Majors in the Chapel Hill field prefer to sell their production rather than to accept delivery into their East Texas field lines because the crude is not on a par with that produced in the latter area.

# Southwest Texas

### *Midway Field Has Distillate Production in Deeper Horizon*

Midway field of San Patricio County is due to be developed in distillate zone 700 feet below the area's present deepest horizon. British American Oil Producing Company's B. E. Ivey 3 was ready for completion after casing was landed at 6058 feet. A sand section was topped at approximately 6042 feet and continued to near the bottom of the hole. Electric log and side-wall samples showed further saturation. On a drill-stem test at 6043-53 feet, recovery was 1 stand of high gravity distillate under 900 pounds pressure. Pipe then was landed on bottom for completion via perforations.

Limits of the Lolita field of Jackson County were being pushed slightly northeast by Cox & Hamon's McCall 1, Block 118, on a Magnolia Petroleum Company farmout. Production test is due through perforations in a sand at 5954-58 feet after the well drilled through the 6300-foot zone without successful results. It showed for a well in the main 5900-foot field pay. Several more operations are due to follow this completion.

Jack Taylor et al's northeast outpost to the Wade City field, Jim Wells County, made an average producer through perforations at 4922-24½ feet. Through 5/64-inch choke, it built up to 1200 pounds on tubing and 1700 pounds on casing. The well is producing from


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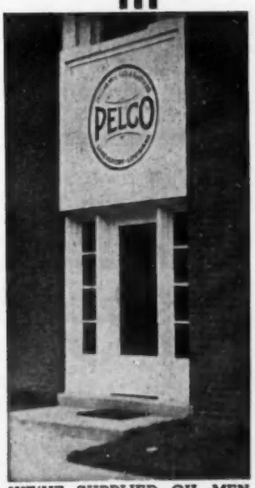


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either the upper McNeill sand or the Kusel zone, a stray lens in the same group found immediately above the McNeill in an outpost northeast of production. In either event, it leads to additional exploration on trend northeast of present production.

Cored to 9062 feet and still in a sandy section with oil and gas showing, Edwin M. Jones' George West Estate 3-B indicates the first production in the Carrizo zone ever found in Southwest Texas. The Live Oak County wildcat has been in the process of reworking for weeks following a blowout and it was not until late in the week that the operation was in a condition to drill ahead.

The hole had drilled to 9039 feet, and while attempting to core, blew out, ran wild and burned equipment. A new special type of drilling rig was set up over the location and the bridge drilled out. The hole finally was cleaned out to 9041 feet where coring was resumed. A 21-foot cut to 9062 feet recovered 10 feet of good firm and rather hard sand with oil show and 10 feet of sandy shale with oil and gas odor. The top of the sand was logged at 9029 feet, giving 33 feet of section with producing possibilities. Regardless of the showing in the Carrizo, the well is supposed to be drilled deeper in search of Wilcox, likely to 11,000 feet.

Hewitt & Dougherty's Weiss 1, east of Tuleta in Bee County, was below 8750 feet without encountering commercial production in the Wilcox zone. It was finding only thin stringers of sand.

Jim Hogg County gained a new field, apparently in a sand between the Government Wells and the Mirando, when Neuhaus, Luckie & Adams completed Gallagher et al 2 for a gas well through 24 perforations at 2855-63 feet. The well made an estimated 12,000,000 cubic feet open flow and when shut in built up to 1100 pounds. The test is in the southwest corner of Block 282, Pippin subdivision, El Randado Grant, and is five miles southeast of Randado. The test had been drilled to 3465 feet, but was plugged back.

# Texas Gulf Coast

## *West Columbia Well Opens New Deep Sand*

Completion of Sid Richardson's Holmes 2, on the north flank of West Columbia Dome, Brazoria County, provided a new sand. Drilled to 8518 feet, it set casing almost to bottom for tests of deep sands, the deepest yet drilled in the area. Casing was perforated in a sand at 8200-60 feet, and the completion showed the well making 146 barrels of 57-gravity oil a day through a 3/16-inch choke under pressures of 2600 pounds on tubing and 2500 pounds on casing. A short extension, the well opens the flanks to still deeper drilling. The sand has been identified as the Hackberry zone in the base of the Frio formation. Sid Richardson holds about 950 acres. Deepest previous drilling on the dome had been two wells by General Crude Petroleum Company, one to 7000 feet on the south side of the dome, and another to just above that depth, both dry holes. Despite the high gravity, the fluid was reported as very dark in color, a crude oil rather than condensate or distillate.

Strake Petroleum Company's Brazoria wildcat, Griffith 1, was still testing. A production test at 10,320-336 feet, following a squeeze job, showed some salt water in the wash water after it started cleaning itself through 5/32-inch choke. It was being allowed to flow for further observation to establish the source of the water.

Housh & Thompson completed the first oil producer in the West Conroe field, which had hitherto made only gas from its one well. Clary 2, after showing too much gas from perforations at 4733 feet, was cemented and then drilled out to the bottom of the casing at 4734 feet, testing just below the pipe after taking in a few inches more sand. After cleaning through 5/64-inch choke, it flowed 31 barrels of 36-gravity oil the first 24 hours into the tanks, with tubing pressure 1625 pounds and casing sealed.

David B. MacDaniel's Hattie Baldwin 1, old Wilcox test in the Tamina area which periodically tested a little oil from around 9400 feet, although never completed, was cleaned out and was being carried deeper. It was drilling below 9890 feet, looking for the deeper Wilcox sands found in the discovery at Lake Creek drilled by Superior Oil Company. Superior Oil Company had reached the Wilcox with its second well, ¾ mile southwest of the discovery, and ran electric log to determine correlation points. It was drilling below 8900 feet.

At Lakeview, Wharton County, W. R. Davis, Inc.'s Hortman 1 failed to produce on latest tests, having swabbed dry with only a very slight showing. Since there had been several cement jobs following several drill-stem tests, mostly showing too much gas, operators treated with acid to break down the cement, thinking possibly the last shots had failed to penetrate the casing and the cement too. After treatment with 1000 gallons, hole was swabbed and seemed to be loosening up some, although it was still swabbing and testing at latest report.

# Louisiana Gulf Coast

## *Deep Production Opened on Anse La Butte East Flank*

W. R. Davis & Company completed Voorhies 2 on the east flank of the Anse La Butte field in St. Martin Parish, for 535.56 barrels daily through a 3/16-inch choke, casing was perforated at 9430-40 feet in oil sand at 9427-43 feet. Tubing pressure was 1650 pounds, and casing pressure 1800 pounds. Gas/oil ratio was 615/1. The well made 31.9-gravity pipeline oil on the test. Total depth was 9449 feet, with production string set at this depth. This well is on the east flank of the dome, 1½ miles east of previous production. This is the operator's second test in the area as well as in South Louisiana, the first being Voorhies 1, 1200 feet southwest, which was abandoned at 8966 feet with a junked hole. The company staked location for Voorhies 3, 467 feet south of the new producer, and was building road. Several companies have tentative locations in the new area. Stanolind Oil & Gas Company has staked locations for two wells south and a little west of the discovery.

On the north flank of this dome, I. N. Pharis plugged Akers 1 after testing a slight show of gas and salt water through perforations at 5952-57 feet. Total depth was 6118 feet in salt, topped

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at 6060 feet. Stanolind Oil & Gas Company made location for Tony Tortoris 1, a north offset to Castille 1, which opened a new deep producing sand on the south flank.

A Wilcox test in the Lake Latainer area, Avoyelles Parish, cemented 5½-inch casing at 6785 feet, and was waiting on cement to test the lower Wilcox sand. The test, Cockburn, Hargrove & Bateman's Snowden Estate 1, recovered stuck drill pipe early in the week and took additional side-wall samples of two Wilcox showings. The upper sand failed to show, but the lower recovered 4 percent saturation in a core at 6695 feet. This wildcat was started by Snowden Estate in 1940, and later abandoned after topping Wilcox at 5175-95 feet. Acid tests of the Wilcox showed negative. W. C. Brock took the well over early this year, and later Cockburn et al.

Phillips Petroleum Company's Dugas 1, which had been testing for some time through perforations at 11,618½-619½ feet, a new deep horizon in the Erath field, was completed, flowing about 250 barrels of clean 41-gravity oil daily through a ¼-inch choke, with tubing pressure 3800 pounds. Operators were moving rig to Fitzsimmons 1, 1½ miles west of Dugas 1.

At South Catahoula Lake, Chamblee & Pitts topped Wilcox at 3060 feet in Lee Lumber Company 1, drilling below 4300 feet. Electric log will be run at about 4600 feet.

Humble Oil & Refining Company's interesting Wilcox test in the Abbie Joe area, Beauregard Parish, was drilling at 7939 feet in shale.

In the Barataria field, Jefferson Parish, The California Company's Fleming Plantation 7 was preparing to perforate 7-inch casing at 10,090 feet for a drill-stem test. Bottom is at 10,800 feet. Sand with oil show had been cored at 10,025-10,062 feet.

Heavy gas pressures have been encountered in Gulf Refining Company's Hayes area wildcat, Calcasieu Parish, which caused equipment to be lost in the hole. Operators were milling on junk, with bottom at 10,534 feet. A string of 7-inch liner was landed at the bottom, and operators went in to drill the plug and dropped the tubing.

Pine Prairie field's second well since discovery last month was spudded: Gail Whitcomb's (St. Gabriel Oil Corporation) Wexler et al 1, a west offset to the discovery.

### *Louisiana Permits*

Thirty-three drilling permits were issued last week by the Louisiana Department of Minerals, of which 10 were in North Louisiana divided among the following parishes: Caddo 5, Claiborne 1, La Salle 2, Natchitoches 1, and Union 1. The 23 in South Louisiana were in the following parishes: Cameron 4, East Baton Rouge 1, Evangeline 2, Jefferson 1, Jeff Davis 1, La Fourche 1, Plaquemines 1, St. Charles 1, St. Martin 5, St. Mary 1, Terrebonne 1, Vermilion 4.

### *Von Ormy Spacing*

An order has been entered by the Texas Railroad Commission providing for standard 2-acre spacing in the Von Ormy field, Bexar County. Wells may be located 150 feet from lease lines and 300 feet apart.


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## North Louisiana

### *Increased Activity Along Louisiana-Texas Line*

Developments in the Logansport-Joaquin gas distillate field along the Louisiana-Texas line, and of the westward spread of exploration on the Olla trend to seek Wilcox production south of the Angelina-Caldwell flexure, have added activity in several other areas along the border of these states.

Two locations were made in Sabine County, Texas, near Hemphill, as a projection of the western part of the play on the Olla trend. Paul H. Pewitt, Longview, moved in materials for Temple Lumber Company 1, J. S. Lacy Survey, six miles each of Hemphill, and F. L. Beauchamp moved in materials for J. J. McLemore 1, Wright Corney Survey, four miles northeast of the same town.

Farther north in Panola County, Texas, nine miles northeast of Carthage, centering around the Ivy Survey, Holcomb & Thomasson leased approximately 2000 acres. Between the Bethany field, Panola County, Texas, and the new shallow Greenwood gas field, Caddo Parish, The Texas Company leased approximately 1700 acres in Townships 15 and 16 north, Range 16 west. In the Bethany field, Mid-States Oil Company will drill a 6500-foot test within the next three weeks on acreage secured recently from H. H. Alvord, who retains shallow rights. Recently, John G. Mayo, Houston, staked location for Frost Lumber Industries 1975 feet from SWc Thomas Kelly Survey, Panola County, a 6500-foot wildcat near Deadwood. This is the first of two wildcat tests on the block, the other to be in the Woolworth Survey.

In Grant Parish, on the Olla trend, Westgate-Greenland Oil Company was assembling a block around Section 11-6n-2w. In the eastern part of this trend, D. W. Gibson has assembled a block in Township 9 north, Ranges 7 and 8 east, Catahoula Parish, which adjoins a block under lease by The Carter Oil Company.

Interest has been renewed in a number of known shallow salt domes in Winn Parish, which is on the Olla trend. Francis Barringer, Monroe, was taking a block around the Sikes dome, acreage being in Township 12 north, Range 1 west.

A south 1½-mile extension of the Travis Peak oil producing area in the Sugar Creek field, Claiborne Parish, was indicated at Hassie Hunt's Deas 1, SE SE 12-19n-6w, which logged a good oil showing in that horizon at 5790-5800 feet.

Shell Oil Company was checking titles to a large block along the Arkansas-Louisiana line in Township 23 north, range 5 west, Claiborne Parish, which it leased soon after discovery of oil at Lisbon December 25, 1936.

Placid Oil Company (H. L. Hunt) last week staked eight new locations in the Olla field, LaSalle Parish, which this operator discovered in 1940 and set off the exploration campaign across Louisiana for shallow Wilcox production. All new locations are on Louisiana Central Lumber Company fee, and are Nos. 89 to 96 inclusive, all in Township 10 north, Range 2 east. The same company has four tests at Olla ready for production tests in the Wilcox. In the Little Creek area of the same parish, the company was testing Tremont Lumber Company 4, NW NW 26-9n-2e. Arkansas Fuel Oil Company was testing Tremont Lumber Company A-12, NE SW 3-9n-2e, and has made location for Tremont D-1, NW NW 10-9n-2e.

## Arkansas

### *Indicate ⅝-Mile Extension of 9200-Foot Zone at McKamie*

A ⅝-mile west extension of the Smackover lime 9200-9300-foot gas-distillate producing area at McKamie, Lafayette County, appeared likely last week at The Carter Oil Company's Cornelius 1, SE SE 30-17-23, which cored at 9160 feet after topping Buckner at 8910 feet and Smackover lime at 9025 feet, practically even with the same contact points in the discovery well, nearest producer. Elevation is 288 feet.

Crescent Drilling Company's W. A. Burns 1, NE SW 13-18-17, Union County wildcat three miles east of the Schuler field, tested salt water in the Reynolds (Smackover) lime at 7607 feet, after topping the Smackover lime at 7595 feet, elevation 211 feet. It probably will plug back and set casing for a production test in the Travis Peak (Morgan sand) that showed some oil in drilling at 5533-48 feet. The Travis Peak is one of the producing horizons at Schuler.

McAlester Fuel Company's Franks 1, C SE SE 16-18-21, Columbia County, which showed for a likely lower Marine oil well at 6910-20 feet, was coring below 7310 feet, having failed to find additional showings. It will go to the Smackover lime.

On the west side of the Atlanta field, Columbia County, Tide Water Associated Oil Company's Hutcheson 2, NE SW 16-18-19, ran casing to bottom at 8240 feet after topping Smackover lime at 8220 feet and picking up porosity at 8223 feet, elevation 250 feet. The same company was drilling below 5950 feet in Talley 2, SW NW 14-18-19 of the same field. Four tests are drilling in the Dorcheat field, another Smackover lime field in Columbia County.

Union Producing Company was negotiating with Crossett Lumber Company for 400,000 acres in Ashley County, southeast Arkansas. If the trade is consummated, Union Producing Company plans twelve 3000-foot tests on the acreage.

Arthur E. Black has a 15,000-acre block centering around SE SE 18-10n-7w, Lincoln County, for a 3500-foot test. In Howard County, Chanoskey et al, Dallas, have taken 5000-acre block for a test in or near Section 12-10s-28w. In Columbia County, Atlantic Refining Company was checking titles on acreage around SE SW 12-15-20, east of Crow Drilling Company's test that discovered oil production in the 3400-foot Travis Peak horizon on the flank of the old Stephens shallow field.

Three drilling permits were authorized last week by the Arkansas Oil & Gas Commission, as follows: Franklin County—Ozark Natural Gas Company's T. J. Blanchett 1, C SE SW 33-10n-26w; Union County—Anthony & Company's Union Sawmill Company 1, NE 15-18-14 and Marine Oil Company's Union Sawmill Company A-5, SW SE SE 3-18-13.

## Mississippi

### *Forty-Acre Spacing Rule Waived for Twelve Permits*

H. M. Morse, Mississippi state oil and gas supervisor, last week waived the 40-acre spacing rule for the Tinsley Dome field, Yazoo County, and granted drilling permits for 12 tests on smaller tracts. Appeals were taken from issuance of two of the twelve granted, and these two will be reviewed by the State Oil & Gas Board.

The 10 issued for less than 40 acres, unopposed and therefore finally granted, are: Sylvan Producing Company, Section 20-10n-2w; S. H. Killingsworth, Sections 20-10n-2w and 18-10n-2w; E. C. Johnston and W. B. Johnson, two locations, Section 31-10n-2w; W. L. Etheridge, two locations, Section 31-10n-2w; John D. Gholson, Section 1-9n-3w; Robert Sellars, Section 1-9n-3w. The two granted and to which opposition was filed were: F. H. Broocks, Section 19-10n-2w, appealed by Union Producing Company and Frankel Brothers, Section 6-9n-2w, appealed by Mid-States Oil Company.

Morse announced that applications for other special permits would be considered June 5.

Alabama has granted an option for one year to Union Producing Company for $1000, with right of renewal for two years, on approximately eighteen miles of land in the Tombigbee River bed, Clarke, Choctaw and Washington Counties. The company already owns a large block on which it recently made location in C NW 27-8n-1w, Clark County, for a 10,000-foot test.

Sinclair-Wyoming Oil Company's C. C. Swayze 1, SE SE 23-12n-1e, Yazoo County, aroused interest when it logged top of chalk at 4344 feet, as compared to a similar contact point of 4566 feet in Arcarea Reserve Company's Holmes 1, a failure drilled several months ago ½-mile southwest of present test.

In the southeast part of the field, G. L. Reasor's Sorrels 1, NE SE 31-10n-2w, logged Woodruff sand at 5002-62 feet and cored another 30 feet and cemented casing for production test.

Roeser & Pendleton completed a squeeze job at Wise 1, SW SW 32-10n-2w, ½-mile east outpost in the southeast end of the field, and reperforated at 5028-32 feet. The test had shown for a well in drill-stem test.

## California

### *Location Being Graded for Another Tejon Ranch Test*

In Section 24-11-19, Tejon Ranch-Grapevine area of Kern County, Richfield Oil Corporation was grading location for its second test on the Tejon Ranch lease. Two years ago the company blocked out some 40,000 acres in this district, which lies at the southern end of the San Joaquin valley, for exploration work. The new location is approximately four miles northeast of company's Tejon Ranch 1, Section 2-10-19. This well was taken below 7000 feet, but failed to pick up showings of importance. Two deep tests were also drilled by the company in the Wheeler

Ridge section of this area, one of which produced a substantial volume of oil from below 10,000 feet for a few days, but failed as a commercial well. The second Wheeler Ridge test was taken to 11,006 feet and tested wet, although it showed a trace of 38-gravity oil.

Continental Oil Company acquired some 2500 acres in this area, and was drilling at 5639 feet in Tejon A-1, Section 28-11-19, reporting shale with streaks of sand showing oil spots.

Western Gulf Oil Company's Lechler 2, deep test in Section 31-5-17, Oak Canyon area of Los Angeles County, now coring at 6601 feet, encountered substantial showing of 22-gravity oil on formation test, with some water. Test was at 6524-69 feet, with packer set at 6485 feet. Fair to strong blow of gas was in evidence during 30-minute period tester valve was open. From 6570 feet to present bottom, formation cored has been predominantly shale.

In the North Whittier area of Los Angeles County, Sunset Oil Company blocked up about 900 acres, and was understood to be planning a test in Section 11-2-11, near intersection of Seventh Street and Los Robles Drive. Several other companies have put down test wells in this area, the deepest of which was carried to 4563 feet.

## Michigan

### *Deep Test Goes Lower In Side-Tracked Hole*

Gulf Refining Company has regained its old total depth and an additional 13 feet of hole, bringing bottom to 7789 feet in Bateson 1, Section 2-14n-4e, Bay County, record depth test for Michigan. The company came close to losing the hole at 7776 feet early last December when fire followed a blowout that took out the entire unit and set up a treacherous fishing job for the full string of drill pipe. Pipe was recovered to 6432 feet, and hole then side-tracked at 6265 feet and diverted 5 degrees with a whipstock. At 7789 feet, circulation was lost in a porous zone that forced a 7-day shutdown. Drilling had not been resumed, but circulation was believed to have been re-established.

Drilling 13 feet of new hole upset earlier opinions that the blowout and fire developed in the top of Niagaran limestone. Last samples taken still showed Salina shale, salt and dolomite. More gas was encountered, but no gauge was made. The company has an 8000-foot string of 7-inch heavy casing racked for running when samples show that the Salina salt beds have been completely penetrated.

One of the most promising wildcats drilled in the basin this year ended a failure. Water Heintz's McCoy 1, Section 2-21n-6w, Missaukee County, a test heavily backed by major companies, logged Dundee dolomite at 3847 feet, with a show of oil at the Bell shale-dolomite contact. First four feet developed water, and the hole was abandoned at 3862 feet.

Efforts to clean up a fishing job on Regal Dutch Petroleum Company's Heasley 2, Section 21-4n-13w, first Trenton lime test in the Salem field, Allegan County, so far have been unsuccessful. Tools were lost at 3792 feet after topping objective at 3725 feet.


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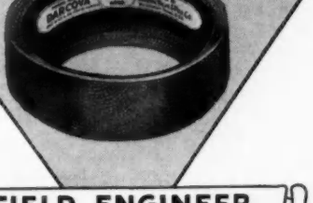
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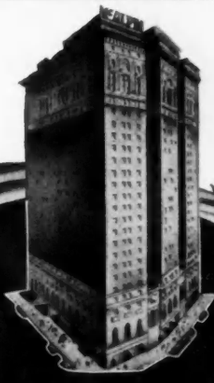
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# UNITED STATES WELL COMPLETIONS

## Arkansas

**Miller County (Fouke)—**
Carter Oil, Sturgis B-1, 2-17-27.... 480 3706
**Ouachita County (Stephens)—**
J. T. Brodie, Hogue 1, 21-15-19... 10 2138
**Union County (Rainbow City)—**
Curtis Kinard, Ward 1, 14-17-14.. 100 2832

## California

**Fresno County (Coalinga Eocene)—**
Robert S. Lytle, No. 44-18F.....2600 7814
Standard, No. 48-31B.....3778 8206
**Fresno County (Kettleman Hills North Dome)—**
Standard, No. 72-33J ..... 210 10060
**Kern County (Coles Levee)—**
Ohio, KCL F-16-25-11 ..... 881 9920
**Kern County (Greeley)—**
General Pet., Mitchell 1.....No Test 11490
**Kern County (Maricopa)—**
Bankline Oil Co., No. 24-24..... * 4325
**Kern County (Round Mountain)—**
Trico O. & G. Co., Coffee 7..... 178 1488
**Kern County (Mt. Poso)—**
General Pet., Heisen 6..... 134 1775
**Kern County (Ten Sections)—**
Shell, No. A-5-29 .....2084 8390
**Los Angeles County (Dominguez)—**
Shell, Reyes 114 ..... 424 4220
**Los Angeles County (Long Beach)—**
Shell, Wilbur 8 ..... 104 3480
**Los Angeles County (Wilmington)—**
Anchor Oil Co., Lacy 1..... 90 3545
Atlantic Oil Co., No. 22.....No Est. 3660
O'Kane & Brain, Mason 1..... 72 3451
Petroleum Management Co., P.M. 16 ..... 175 3708
Sonwell Oil Co., Sonwell 5..... 200 4015
Union Pacific, UP E-32.....2518 3450
Universal Cons. Oil Co., Newport 5 44 4150
**Santa Barbara County (Capitan)—**
Shell, Coverrubias 1-34..... 941 1420
**Santa Barbara County (Santa Maria Valley)—**
Union, Acquistapace 2.....No Est. 4461
**Ventura County (Ventura Avenue)—**
Shell, Taylor 135 (pb 8275).....1440 8562

## Indiana

**Gibson County—**
Joe Bander et al, Cooper 42, sw nw se 13-3s-14w ..... 84 2503
Hall Edwards, Rec., Maier 35, nw ne nw 14-3s-14w ..... 375 2554
Continental, Mumford Realty Co. 5, nw se nw 25-3s-14w..... * 2915
Bozeman 37, sw nw sw nw 26-3s-14w ..... 198 2901
W. C. McBride et al, Blood 2, se se ne 28-3s-14w ..... 40 2950
**Posey County—**
Ed Holmans, Mumford Realty Co. 3, sw ne sw ne 32-3s-13w..... 15 2461
Tide Water, Doll 6, nwc sw se 33-3s-14w ..... 150 1855
Johnson Oil & Rfg., Spencer 1, se se se 26-7s-15w..... * 2771
**Spencer County—**
Ladmer et al, Cokes 1, sec ne ne 12-7s-8w ..... 27 1047
McPherson, Nichols 1, swc nw nw 10-8s-6w ..... * 1075
**Vigo County—**
Sage & Farley, Campbell 1, ne nw 24-11n-8w ..... * 3000

## Iowa

**Fremont County—**
Ohio, Wisnom 1, c nw ne 23-68n-41w * 3378

## Kansas

**Barton County—**
B. B. & M. et al, Krier "C" 1, c w½ nw se 30-16-11w.....1655 3170
Shell, Krautwurst 4, se nw nw 10-17-11w ..... 300 3327
Clay Bros. et al, Bahr 1, c n½ ne sw 35-18-15w.....¶1.5 3547
Springer et al, Rick 3, c n½ sw sw 1-19-11w ..... 147 3345
Virginia Dr. Co., Clawson 4, c s½ se nw 17-20-11w..... 376 3316
Hollow Dr. Co., Schartz 2, c e½ ne nw 18-20-11w.....1500 3313
Texas, Disque 10, nwc sw 3-17-11w 48 3341
Stanolind, Hagen 1, c n½ nw se 20-20-11w ..... * 3397
Texas, Burmeister "A" 4, c e½ nw sw 2-17-11w ..... 762 3323
Atlantic & Simpson, Asher 2, c w½ ne nw 31-20-13w ..... 73 3273
**Butler County—**
Simpson, Piper "B" 1, swc nw 17-29-4e ..... * 1903
Clyde Wilson, Baum 1, sw swc nw 21-29-4e ..... * 1941
**Ellis County—**
Cities Service, Collahan "A" 23, sec sw 24-11-17w .....3000 3423
Jantzen 1, ne se se 5-12-16w..... * 3479
Nadel & Gussman, Carmichael 3, c s½ se ne 11-11-18w.....3000 3404
Phillips, Carmichael 4, sw ne se 11-11-18w .....3000 3403
Darby, Peavey "A" 5, c n½ nw sw 13-11-18w .....3000 3336
**Ellsworth County—**
H. V. Elwell, Adamek 2, c n½ sw nw 17-16-10w .....1193 3393
Mid-Continent, Matosh 3, c n½ nw ne 34-16-10w ..... 534 3295
Cities Service, Mollhagen "B" 3, se nwc ne 29-17-9w ..... * 3302
Phillips, Grounds 1, c w½ sw sw 12-17-10w ..... 998 3280
**Graham County—**
Cetal, Lyon 1, swc 1-8-24w..... * 3840
**Grant County—**
Clay Bros. et al, Hepthorne 1, sw se nw 15-28-37w .....¶8.5 2632
**Greenwood County—**
Saco, Sample 1, nwc sw 27-26-13e (pb 1490) ..... 40 1492
**Harvey County—**
Hall-Jordan, Short 1, sw ne nw 18-23-3w ..... 165 3374
**Kearney County—**
Stanolind, Bellinger 1, c e½ se sw 15-21-38w ..... * 5155
**Leavenworth County—**
McLaughlin et al, Steenstry 1, c ne nw 3-10-20e .....¶1.0 1429
**Marion County—**
Hauser & Adams, Hauser 5, c e½ sw se 28-17-4e ..... 677 2422
Ring-Mac, Schick 4, c w½ se nw 33-17-4e ..... 153 2434
**McPherson County—**
Wakefield, Koehn 2-C, c w½ se nw 36-19-2w ..... 20 2968
**Pratt County—**
Beardmore, Kemp 3, c n½ nw ne 12-28-11w ..... * 4352
**Rice County—**
Cities Service, Batterton 3, c n½ se se 11-18-8w ..... * 3275
Roelfs 1, c e½ ne se 26-18-10w. * 3262
Transwestern, Roesler 5, c e½ sw nw 6-18-10w .....3000 3244
Westgate-Greenland, Malm 1, c e½ se sw 24-20-6w.....1292 3310
C. B. Davis, Anna 4, c s½ ne sw 10-20-9w ..... 597 3246
Vickers, Rose "B" 1, se ne se ne 19-20-10w (pb 3256).....3000 3303
Rose "A" 2, c n½ nw sw 20-20-10w .....3000 3294
H. B. Garden, Oden 2, c e½ e½ nw 5-21-7w (pb 3359)..... 96 3367
**Rooks County—**
Hartman et al, Verka 1, c n½ ne ne 28-8-19w ..... * 3486
Krueger, Tatkenhorst 3, c n½ sw sw 11-9-16w .....3000 3225
Tatkenhorst "D" 1, c w½ ne ne 15-9-16w (pb 3300)..... 330 3407

## Summary of Drilling Operations in the United States, Week Ended May 24, 1941

| | WELLS COMPLETED | | | | | | | | *PERMITS FOR NEW WELLS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | New Wells Drilled for Oil and Gas | | | | | | | | | | | |
| | Total for Week | Oil Wells | Gas Wells | Failures | †Miscellaneous | Initial Production | Total 1941 | Total this Date 1940 | This Week | Total this Month | Total 1941 | Total this Date 1940 | Year Total 1940 |
| Arkansas | 3 | 3 | .... | .... | .... | 590 | 64 | 80 | 3 | 11 | 65 | 58 | 153 |
| California | 21 | 20 | .... | 1 | .... | 15,873 | 435 | 459 | 23 | 62 | 390 | 464 | 1,042 |
| Colorado | ..... | .... | .... | .... | .... | ..... | 6 | 3 | .... | ..... | ..... | ..... | ..... |
| Illinois | ..... | .... | .... | .... | .... | ..... | 1,234 | 1,439 | 103 | 294 | 1,648 | 1,653 | 4,532 |
| Indiana | 11 | 7 | .... | 4 | .... | 889 | 197 | 156 | .... | ..... | .... | ..... | ..... |
| Iowa | 1 | .... | .... | 1 | .... | ..... | 1 | ..... | .... | ..... | .... | ..... | ..... |
| Kansas | 55 | 32 | 3 | 12 | 8 | 45,997 | 812 | 690 | 48 | 149 | 800 | 802 | 2,048 |
| Kentucky | 4 | 2 | .... | 1 | 1 | 50 | 115 | 98 | .... | ..... | .... | ..... | ..... |
| Louisiana | 17 | 14 | .... | 3 | .... | 2,518 | 528 | 651 | 33 | 111 | 640 | 654 | 1,658 |
| Michigan | 15 | 6 | .... | 9 | .... | 365 | 377 | 506 | 12 | 48 | 315 | 487 | 1,093 |
| Mississippi | 3 | 3 | .... | .... | .... | 1,730 | 66 | 72 | .... | ..... | .... | ..... | ..... |
| †Missouri | 1 | .... | .... | 1 | .... | ..... | 5 | 5 | 1 | 1 | 6 | ..... | 26 |
| Montana | ..... | .... | .... | .... | .... | ..... | 66 | 62 | .... | ..... | .... | ..... | ..... |
| *Nebraska | 3 | 1 | .... | 1 | 1 | 127 | 39 | ..... | 2 | 6 | 31 | ..... | 69 |
| New Mexico | 6 | 6 | .... | .... | .... | 648 | 140 | 315 | 7 | 23 | 154 | 300 | 559 |
| New York | 18 | 12 | .... | .... | 6 | 77 | 281 | 442 | .... | ..... | .... | ..... | ..... |
| Ohio | 26 | 5 | 10 | 6 | 5 | 38 | 614 | 296 | .... | ..... | .... | ..... | ..... |
| Oklahoma | 39 | 21 | 2 | 12 | 4 | 13,103 | 794 | 896 | 47 | 127 | 767 | 798 | 1,888 |
| Pennsylvania | 59 | 36 | 11 | 3 | 9 | 38 | 896 | 1,571 | .... | ..... | .... | ..... | ..... |
| South Dakota | ..... | .... | .... | .... | .... | ..... | ..... | 1 | .... | ..... | .... | ..... | ..... |
| Tennessee | ..... | .... | .... | .... | .... | ..... | ..... | 8 | .... | ..... | .... | ..... | ..... |
| Texas | 203 | 140 | 4 | 57 | 2 | 92,220 | 3,723 | 4,280 | 357 | 673 | 4,326 | 5,065 | 11,170 |
| Utah | ..... | .... | .... | .... | .... | ..... | ..... | 1 | .... | ..... | .... | ..... | ..... |
| West Virginia | 12 | 3 | 7 | 2 | .... | 61 | 269 | 226 | .... | ..... | ..... | 261 | 782 |
| Wyoming | ..... | .... | .... | .... | .... | ..... | 39 | 60 | .... | ..... | ..... | 1 | 1 |
| Total this week | 497 | 311 | 37 | 113 | 36 | 174,324 | 10,701 | 12,317 | 636 | 1,505 | 9,142 | 10,543 | 25,021 |
| Total last week | 588 | 366 | 54 | 131 | 37 | 159,077 | 10,141 | 11,635 | 332 | 869 | 8,506 | 10,103 | 25,021 |
| Total this year | 10,638 | 6,778 | 901 | 2,435 | 524 | 3,188,095 | ..... | ..... | .... | ..... | .... | ..... | ..... |

* This tabulation includes those states where weekly data are available; figures for Missouri date from August 10, 1940; Nebraska from August 3, 1940.
† Includes old wells deepened, water-intake, gas input, and salt water disposal wells.

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Russell County—** | | |
| Cities Service, Weimesiter 1, sec sw 25-14-13w | 413 | 3104 |
| Darby, Strecker "A" 4, c s½ se ne 25-14-14w | 3000 | 2968 |
| Jones Bros., Grizzell 1, c w½ nw ne 33-15-12w | * | 3325 |
| **Stafford County—** | | |
| Stanolind, Scheive 2, c e½ sw se 12-22-13w | 267 | 3685 |
| Crawford 3, c n½ se ne 15-24-12w | 3000 | 3832 |
| **OLD WELLS DEEPENED** | | |
| **Butler County—** | | |
| Cities Service, Reetz 2, se nw se 34-27-5e (otd 2720) | 115 | 3125 |
| Sace, McGinnis 9, c ne ne 9-27-6e (otd 2660) | 50 | 3149 |
| **Ellsworth County—** | | |
| Magnolia, Andrea 6, nw sw sw 7-17-10w (otd 3106) | 24 | 3366 |
| **Rice County—** | | |
| C. B. Davis, Anna 2, ne se sw 10-20-9w (otd 3232) | 300 | 3249 |
| Rosetta 1, nec nw 15-20-9w (otd 3226) | 493 | 3239 |
| **Russell County—** | | |
| McBride, Jellison 2, se ne sw 19-13-14w (otd 2957) | 94 | 3202 |
| National Ref., Keinhardt 1, nec 19-14-14w (otd 3023) | 285 | 3082 |
| **Stafford County—** | | |
| Stanolind, Hays 8, c s½ ne se 11-24-11w (otd 3758) | 3000 | 3793 |

## Kentucky

| | | |
|---|---|---|
| **Hancock County—** | | |
| Jasper Oil Co., Jett 8 | 10 | 760 |
| **McLean County—** | | |
| Roy Mace et al, Fitzhugh 1 | * | 1825 |
| **Ohio County—** | | |
| Arnold Likens, Lewis 1 | 15 | 479 |
| **OLD WELL DEEPENED** | | |
| **Daviess County—** | | |
| Andy Teller, Conners 1 (otd 1257) | 25 | 1283 |

## North Louisiana

| | | |
|---|---|---|
| **Caddo Parish (Pine Island)—** | | |
| Davis & Hart, Muslow B-6, 32-21n-15w | 30 | 1524 |
| **La Salle Parish (Olla)—** | | |
| Carter Oil, Cockerham 1, 24-10n-2e | 240 | 2313 |
| **La Salle Parish (Nebo-Jena)—** | | |
| H. L. Hunt, Goodpine A-21, 17-7n-3e | 200 | 3815 |
| **Sabine Parish (Pleasant Hill)—** | | |
| J. E. Watts, Cook 1, 27-10n-11w mat. | * | 3475 |

## South Louisiana

| | | |
|---|---|---|
| **Acadia Parish (North Crowley)—** | | |
| Vincent & Welsh, Fisher 1 | 216 | 8832 |
| **Calcasieu Parish (Sulphur Mines)—** | | |
| Union Sulphur, Noble 3 | 72 | 7285 |
| **Cameron Parish (East Hackberry)—** | | |
| Union Sulphur, Watkins 47 | 138 | 3185 |
| **Cameron Parish (Pecan Lake)—** | | |
| Superior, Miami Corp. 1 | ¶1.82 & 26 | 10,883 |
| **Evangeline Parish (Ville Platte)—** | | |
| Continental, Ortego 1 | 110 | 10,103 |
| Gulf, Vidrine et al 2 | 337 | 10,118 |
| **Iberia Parish (Little Bayou)—** | | |
| Helis, Schwing 11 | * | 4405 |
| **La Fourche Parish Lake Long Field)—** | | |
| Fohs & Pilgrim, State 14 | ¶4.23 & 87 | 9970 |
| **Plaquemines Parish (Potash Dome)—** | | |
| Humble, Orleans 50 | 389 | 8712 |
| **St. Landry Parish (Port Barre)—** | | |
| McDannald Oil Co., Sebille 2 | 333 | 5648 |
| **St. Martin Parish (Anse La Butte)—** | | |
| Stanolind, Bergeron 4 | 48 | 3915 |
| **St. Martin Parish (West Lake Verret)—** | | |
| Shell, State 1 | 292 | 8848 |
| **OLD WELL DEEPENED** | | |
| **St. Mary Parish (Wildcat Franklin area)—** | | |
| Bateman Dr. Co., Foster 1 (otd 10,481) | * | 10,991 |

## Michigan

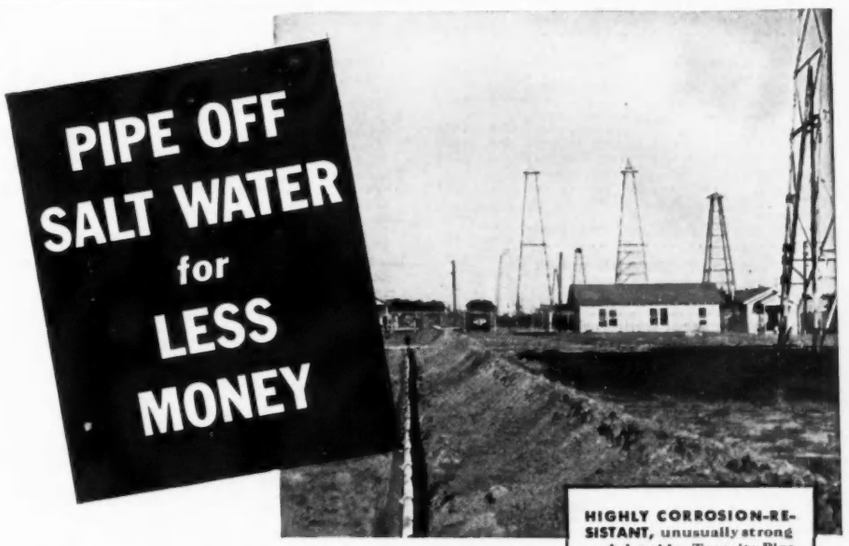
| | | |
|---|---|---|
| **Allegan County—** | | |
| Walter L. McClanahan, Graezyk 1, ne nw se 19-4n-12w | * | 1576 |
| Bridger-Basin Oil Corp., Pollitt 1, sw se sw 6-2n-11w | * | 1720 |
| W. C. Prather, Schapp 2, se sw sw 34-4n-14w | 30 | 1554 |
| Union Oil Co., Bond 2, nw sw se 10-4n-13w | 100 | 1606 |
| Socony-Vacuum, Thomas 1, sw sw se 11-4n-13w | 115 | 1590 |
| Salem G. & O. Co., Funk 2, sw nw ne 14-4n-13w | 40 | 1595 |
| **Calhoun County—** | | |
| Floyd Skirvin, Hallock 1, ne sw nw 14-3s-7w | * | 1458 |
| **Lake County—** | | |
| Taggart Bros. Co., Balderschneider 13, c e½ 25-18n-11w | * | 1259 |
| **Midland County—** | | |
| Sun, State 2, c n nw se 4-16n-1w | * | 4015 |
| **Missaukee County—** | | |
| Walter Heintz, McCoy 1, c w sw nw 2-21n-6w | * | 3862 |
| **Montcalm County—** | | |
| Socony-Vacuum, Sneary 1, c e se se 14-10n-5w | * | 3214 |
| **Osceola County—** | | |
| Taggart Bros. Co., Bland 20, c se 29-18n-10w | * | 1157 |
| Reber 19, c ne 32-18n-10w | * | 1208 |
| **Ottawa County—** | | |
| Fisher-McCall, Inc., Mackus 3, ne se nw 2-6n-13w | 60 | 1781 |
| Heyboer 1, ne ne nw 12-6n-13w | 20 | 1866 |

## Mississippi

| | | |
|---|---|---|
| **Yazoo County (Tinsley Dome)—** | | |
| Union Prod. Co., Berry 3, 25-10n-2w | 480 | 4889 |
| Berry 4, 25-10n-2w | 800 | 4996 |
| Stevens 19, 24-10n-3w | 450 | 4796 |

## New Mexico

| | | |
|---|---|---|
| **Eddy County—** | | |
| J. E. Hughes et al, Brooks 4, swc nw 19-17s-28e | 7 | 560 |
| Sam Sanders et al, Berry 13, sec ne 24-17s-27e | 6 | 585 |
| Neil Wills et al, State 1-B, ne sw 20-20s-30e | 60 | 1548 |
| **Lea County (Maljamar)—** | | |
| W. J. Rutledge et al, State-Texaco 2-0, c sw sw 16-17s-32e | 294 | 4061 |
| **Lea County (Mattix)—** | | |
| Trinity Dr. Co., Mattix 4, c sw ne 10-24s-37e | 158 | 3531 |
| **Lea County (Penrose)—** | | |
| Danglade & Clower, Wortham-Ohio 2, nw sw nw 11-22s-27e | 123 | 3693 |


**HIGHLY CORROSION-RESISTANT,** unusually strong and durable, Transite Pipe keeps maintenance costs low on salt-water lines.

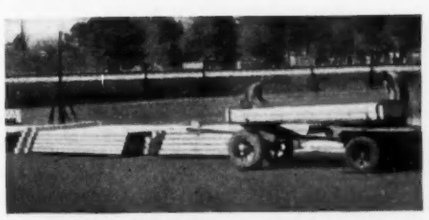
**Wherever J-M Transite Pipe is used, oil producers enjoy these IMPORTANT SAVINGS on salt-water disposal systems:**

**FAST INSTALLATION** . . . Unusually light in weight, Transite Pipe is easy to handle and carry to the job. Long, 13-foot sections reduce the number of joints in the line. Assembly is so simple that even unskilled crews can finish jobs in the shortest possible time at lowest cost.

**JOINTS STAY TIGHT** . . . Simplex Couplings are unusually flexible . . . stay tight throughout the system's long life. Because leakage is minimized, there's little or no danger of your salt-water lines damaging crops or polluting ground water.

**LOW MAINTENANCE** . . . Made of asbestos and cement, Transite Pipe offers unusual resistance to corrosive action of salt water inside, acid soil outside. It can't rust, rot or decay . . . gives long service under severe conditions. And when lines must be relocated, Transite has high salvage value.

**ON LEAD LINES** as well as salt-water systems, Transite is giving better, lower cost service. For details, write for brochure DS-320. Johns-Manville, 22 East 40th St., New York, N. Y.



**BECAUSE** of its light weight, small trucks can carry large loads of Transite Pipe to location . . . handling and installation costs are reduced.

**Johns-Manville**
**TRANSITE PRESSURE PIPE**
For Salt Water Disposal Systems and Lead Lines

# United States Well Completions—*Continued*

## Missouri

**Holt County—**
Brin & Nathan, Decker 2, nwc 1-61n-38w ..... • 2424

## Nebraska

**Richardson County—**
Ohio, Bahr 1, se sw se 7-1n-16e.. 127 2280
Johnson & Mitchell, Eickhoff 2, c nw nw 4-2n-16e..... • 2571
**OLD WELL DEEPENED**
I. T. I. O., Bankers Life 1, c ne se 3-2n-15e (otd 2483)..... • 3185

## New York

**Allegany County—**
Bradley Prod. Corp., Bascom farm, Alma ..... 9 1343
Tyler & Livermore, Root farm, Bolivar ..... 5 1283
Franchot Oil Co., Murphy farm, Bolivar ..... 6 1422
Central Oil Co., Holtum farm, Scio 8 1079
Bradley Prod. Corp., Duke farm, Alma ..... 6 1442
Otsquago Oil Corp., Pike farm, Alma ..... 9 1417
L. H. Thornton et al, Fassett farm, Alma ..... 5 1270
Clair Oil Co., Carrier farm, Wirt.. 4 1267
Otto Oil Co., Bartlett farm, Bolivar 6 1234
New York Oil Co., Brown farm, Bolivar ..... 7 1374
Jacob Trenkle Est., Hill farm, Genesee ..... 5 1339
Sloan & Zook, McDivitt farm, Bolivar ..... 7 1387

**WATER INTAKE WELLS**

**Allegany County—**
Tyler & Livermore, Root farm, Bolivar ..... ... 1272
South Bolivar Oil Co., McKelvey farm, Bolivar ..... ... 1378
R. B. Moore 6, Thomas farm, Bolivar ..... ... 1370
Messer Oil Co., Miles farm, Bolivar ... 1532
Bohne Bros., Helmhold farm, Wellesville ..... ... 1338
Crowley Bros. & Gordon, Harrington farm, Andover ..... ... 1287

## Ohio

**Ashland County—**
Roy Stewart, Shearer 1..... • 3000
**Athens County—**
J. Wickens et al, Lucas 1.....¶0.64 859
**Coshocton County—**
Blackburn et al, Crawford 1.....¶0.9 3030
**Fairfield County—**
Preston Oil Co., Hite 1.....¶0.3 2760
**Holmes County—**
Ohio Fuel Gas, Mattocks 1..... • 3350
**Licking County—**
McCloy, Inc., Wilson 1.....¶2.5 2400
Kundtz-Hulse, Inc., Keckley 1....¶0.5 2415
**Medina County—**
D. E. Frestro & Sawyer, Allis 24-F 5 403
Allis 24-H ..... • 408
Marine Tr. Co., Packard 46-A.... 5 415
Packard 47-A ..... 5 447
**Meigs County—**
Ohio Fuel Gas, Dean 1..... 20 1698
Wilford et al, Swick 3..... • 745
**Muskingum County—**
Gas Prod. Co. of O., Hutson 1....¶3.5 4096
**Perry County—**
Palm Oil Co., Forgraves 3....¶0.1 & 185 3401
Floyd W. Hull et al, Conaway Hrs. 1 ..... 3 3315
Crude Oil Co. et al, Maddox Hrs. 2.¶0.5 3370
C. Z. Ruth, Northwest Coal 26.... • 1152
**Stark County—**
C. W. White, Brumbaugh 1.....¶0.89 4589
**Washington County—**
Interstate Co., Roberts 1.....¶0.8 1362
**Wayne County—**
Ohio Fuel Gas, Rumbaugh 1..... • 3585

**GAS INJECTION WELLS**

**Medina County—**
Marine Tr. Co., Packard 50-O.... ... 402
Packard 54-0 ..... ... 454
Packard 60-0 ..... ... 400
Packard 61-0 ..... ... 419
Packard 62-0 ..... ... 463

## Oklahoma

**Carter County—**
S. & D. Daube, Fee 4, ne nw sw sw 17-4s-2w ..... 600 2241
Kyle, Daugherty 3, nw se sw sw 17-4s-2w ..... 400 2158
W. H. Smith, Ward 15, nw se ne ne 19-4s-2w (pb 2238)..... 456 2277
Tide Water, Ward 2, nw ne se ne 19-4s-2w ..... 600 2260
Dixon & Lausen, Woodsworth 5, sw se nw nw 20-4s-2w ..... 418 2089
W. Neustadt, Choate (20) 3, c w½ nw nw 20-4s-2w ..... 720 1955
Choate (20) 6, nw sw nw nw 20-4s-2w ..... 240 2039
**Creek County—**
L. B. Jackson, Prince 1-A, sec ne 26-19n-9e ..... • 2840
**Grady County—**
Skelly, Edmondson 5, c w½ nw nw 23-5n-8w ..... • 5402
**Hughes County—**
F. R. Phelps et al, Ball 1, nw sw se 12-7n-8e ..... • 1053
Wrightsman Oil et al, Harjo 1, sw se ne 2-9n-8e ..... • 4007
**Jackson County—**
Altus Pet. Co., Maud 5, ne sw ne 15-1n-20w ..... 95 1538
**Latimer County—**
Le Flore G. & E. Co., McTerran RO-40, c sw sw 3-6n-22e.....¶26.7 1511
**Lincoln County—**
Morgan-Gulf Prod. Co., School Land 1, ne sw ne 16-12n-5e.... • 5178
Wilcox, Curry 1, nec nw 8-15n-5e • 4100
Helmerich & Payne, Hennessey 1, nwc se 23-16n-3e ..... • 4872
**Marshall County—**
Pure, Little (106) 5, ne sw sw 27-5s-7e ..... 618 5078
**Okfuskee County—**
Keener, Sands 1, sw se nw 26-12-8e • 4150
Shell, Taylor 4, ne sw sw 26-12n-8e 480 3653
**Okmulgee County—**
W. B. Pine, Carruth 7, sw nw se 18-13n-14e ..... 4 490
Jennings 6, sw se ne sw 18-13n-14e ..... • 511
Thirteen Oil Co., Andy 4-A, sw nwc 28-14n-14e ..... • 1271
**Osage County—**
Bay Oil Co., 2, se sw se sw 34-29n-11e ..... 25 945
**Pittsburgh County—**
Utilities Prod. Co., Carney 2, ne sw se 4-7n-18e ..... • 2106
**Pontotoc County—**
North American, Mayer 1, ne nw ne 20-4n-7e ..... • 20
Towne & Morrison, Kroeger 3-A, c se nw 25-5n-6e (pb 2040).....¶10.0 2110
**Pottawatomie County—**
Atlantic, Spaugy 4, ne sw nw 6-6n-4e ..... 499 4486
Merkle 1, sw nw ne 32-8n-5e.... 318 4367
Stuart & Stout, Gardner 2, c se sw 19-6n-4e ..... 192 3598
Simpson-Fell, Billington 1, c nw se 24-9n-4e ..... 112 4157
Hall-Jordan, Whitehead 1, c w½ se sw 36-10n-3e .....2625 5249
**Seminole County—**
Mid-Continent, Ferguson 4, se sw sw 18-7n-8e ..... 170 1512
Fish 1, nw ne nw 19-7n-8e .... 181 1501
Hall, Troup, Moore, Fish 1-A, sw se nw 19-7n-8e ..... 125 1504
**Tillman County—**
I.T.I.O., Graham 8, csl sw nw ne 1-3s-19w .....3424 5037

**OLD WELLS DEEPENED**

**Oklahoma County—**
F. R. Henson et al, Giles 1, ne nec sw 15-11n-3w (otd 6550)..... 538 6565
Sunray, Brewer 1, ne ne sw se 27-12n-3w (otd 6492)..... 260 6540
**Stephens County—**
Cities Service, Cantrell 6, sw sw se sw 32-1s-8w (otd 2242)..... 3 2258

**GAS INPUT WELL**

**Osage County—**
Sinclair Prairie, Winona 10, sw nw se nw 15-17n-12e ..... ... 1581

## Pennsylvania

**BRADFORD DISTRICT**

George C. Day, Lundy..... ⅛ ....
George Van Vechten & Son, Tarr. 2 ....
Forest Oil Corp..... 1 ....
Forest Pet. Corp..... 1 ....
Niagara Oil Corp., 5 wells..... 5 ....
Bradford Tr. Co., 22 wells..... 22 ....
Penn Valley Crude Oil No. 2, Fee 1 ....

**WATER INTAKE WELLS**

D. Y. M. Corp., Bing 466..... ... ....
Merry Bros., Burger..... ... ....
Forest Oil Corp., 2 wells..... ... ....
Forest Pet. Corp., 2 wells..... ... ....
Niagara Oil Corp., 2 wells..... ... ....
Messer Oil Corp., Loop..... ... ....

**NEW YORK-PENN GAS FIELD**

C. E. Updegraff, Ben Barcus 2.. ¶ ....

**MIDDLE DISTRICT**

United Nat. Gas Co., Powell..... ¶ ....
I. Dana Kahle, Berlin..... • ....
W. D. & F. T. Barry, Barry..... 2 ....
South Penn Oil Co., Smith & Grace 1 ....
Titusville Tr. Co. & Fleming, Lot 3192 ..... ¼ ....

**BUTLER-ARMSTRONG DISTRICT**

R. A. Marshall, Marshall Hrs. .... 1 ....

**SOUTHWEST DISTRICT**

**Armstrong County—**
Equitable Gas, Claypool 2.....¶0.58 3400
L. L. Livingood, Wright 1.....¶0.18 3477
**Fayette County—**
Duquesne Gas, Cover 2.....¶0.36 3401
**Greene County—**
Manufacturers, Wood 1.....¶1.04 937
Charles R. Sample, Dinsmore 1...¶0.18 1280
Equitable Gas, Roberts 1.....¶0.09 3595
D. E. Mayne et al, Kovack 1.... • 2310
**Washington County—**
Carnegie Nat. Gas., Nelan Hrs. 2.¶0.07 3043
McGuigan O. & G., Buchanan 1...¶0.03 850
Victor Behm et al, Smith..... • 2900
**Westmoreland County—**
Peoples Nat. Gas., Wylie 1.....¶0.05 4207

## East Texas

**Joiner Area—**
Texas Canadian Oil Corp., Frederick 4-B-a (14-ac) ..... 32 3595
**Kilgore—**
C. A. Everts Dr. Co., Christian 2-A (7½-ac) .....1200 3760
Houston Oil Co., Hughey 7-A (44.23-ac) .....3200 3535
Julian O. & Roy. Co., England 12 (32-ac) ..... 750 3588
Texas Canadian Oil Corp., Watson 3 (3-ac) .....6000 3565
Tide Water, Hughey 38 (200-ac)..2500 3492
Hughey 39 (200-ac) .....2000 3479
**Longview Area—**
Cox & Hamon, Rodden 20 (110-ac).3600 3632
General American & Sun, Bingham 20 (99.56-ac) .....2200 3520
Philbro Properties, Mathews 6 (70-ac) ..... • 3727
Shell, Saulter 9 (35.4-ac).....3600 3732
Sinclair Prairie, Lawson 24 (84.19-ac) .....4000 3592
**Cherokee County Wildcat)—**
American-Liberty Oil Co., Austin 1 • 4748
**Freestone County (Wildcat)—**
Carter-Gragg Oil Co., Mims 1..... • 5254
**Henderson County (Flag Lake)—**
Texas Co., Nolan 4 (280-ac)..... • 3052
**Morris County (Wildcat)—**
C. B. Zuber et al, Blackburn 1.... • 5676
**Navarro County (Richland)—**
Mrs. B. L. Walkup et al, Bounds 1 • 3000
**Navarro County (Powell)—**
C. D. Bird et al, Birdwell 1..... • 591
Birdwell 2 ..... • 960
**Wood County (Hawkins)—**
L. A. Demmer-W. L. Stewart, Beav 1 ..... 478 4869
General American Oil Co., Holmes 1-A ..... 462 4814
General American-Geo. DeMontrond, Gray 1..... 471 4810
Hollandsworth Dr. Co., Green 1.. 437 4836
C. A. Holley-R. J. Caraway, Crow 1 (17/100-ac) ..... 267 4858
Humble, Shamburger 1 (98.83-ac). 233 4890
Yates 1 (67.91-ac) ..... 456 4702
Pearce & Kermit Smith, Morrison 1 (5/10-ac) ..... 476 4833
O. F. Wencker et al, Surratt 2 (30-ac) ..... 452 4880

## West Central Texas

**Bosque County (Wildcat)—**
T. B. Kendrick et al, Beeker 1.... • 507
**Brown County (Wildcat)—**
Central Texas Gas Co., Smith 1.. † 1868
**Brown County—**
Hagan & Stewart, Perry 5..... • 932
**Callahan County (Wildcat)—**
H. R. Clay-Fred Hyer, Hennessy 1 • 1820
**Callahan County—**
John W. Hooser et al, Mobley 1.. • 602
**Coleman County—**
Robt. McKissick et al, Morris 9.. 195 3622
States Oil Corp., Morris 9..... 274 3573
**Jones County—**
Humble, Gunter 1..... 612 3048
Huddleston 3 ..... 251 2425
Snoddy Bros. et al, Akens-Sinco 2 • 2133
**Palo Pinto County (Wildcats)—**
P. F. Cole et al, Crawford 1..... • 2210
Elgin P. Wilson et al, Watson 1.. • 4065
**Shackelford County (Wildcats)—**
B. & F. Bonded Warehouse Co., Snyder 1 ..... • 850
J. W. Keys et al, Smalley 1..... • 891

## Texas Panhandle

**Carson County—**
Cities Service, Burnett 39-A.....¶33.0 2509
Burnett 2-C ..... 91 3172
E. W. Means et al, Cooper 5-B... 67 3067
**Gray County—**
Phillips Pet. Co., Benton 5-A.... 105 3267
S. & M. Oil Co., Worley 11..... 21 3250
Stanolind, Waggoner 12..... 45 3270
Texas Co., Chapman 10-A..... 113 2867
**Hutchinson County—**
Cree & Hoover, Harvey Sisters 12. 145 3059
Kewanee Oil Co., Lewis 54..... 423 3007
Paloma O&G Co., Lewis 9..... 229 3000
Phillips Pet., Crockrell 55..... 184 2991
Cockrell 58 ..... 164 3085
Cockrell 59 ..... 210 3090
Lizzie 4 ..... 47 3218
Shell, Harvey Sisters 21-B..... 409 3078
Travelers Oil Co., Haile 12-B.... 504 3034
**Moore County—**
Texoma Nat. Gas, Haile 2-M....¶10.6 3179

# United States Well Completions—*Continued*

## West Texas

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Cochran County (Slaughter)—** | | |
| Atlantic, Boyd-Humble 11 | 1459 | 5062 |
| Devonian Oil Co. et al, Boyd 2 | 1344 | 5058 |
| Duggan 6-A-10 | 792 | 5006 |
| Magnolia, Woodley 5 (1280-ac) | 837 | 4995 |
| Mallet 5-J (891-ac) | 1264 | 5080 |
| **Crane County (Gulf-Waddell)—** | | |
| Gulf, Henderson 26 | 240 | 3553 |
| **Ector County (Foster)—** | | |
| Kewanee Oil Co., Foster 4 | 92 | 4145 |
| Geo. Livermore, Inc., Johnson-Ohio 2, sec 40 | 646 | 4153 |
| Sinclair Prairie, Johnson 7-C | 1114 | 4180 |
| Stanolind, Johnson 2-B | 61 | 4186 |
| **Ector County (Jordan)—** | | |
| Snowden & McSweeney Co., University 7, Ise. 2 | 1257 | 3600 |
| **Ector County (North Codwen)—** | | |
| W. J. & J. Moran, Smith 2 | 636 | 4402 |
| **Gaines County (Seminole)—** | | |
| Amerada Pet. Corp., Austin 2 | 613 | 5240 |
| Turlin 7 | 613 | 5320 |
| **Gaines County (Wasson)—** | | |
| Continental & Amon Carter, Langdon 13-44 | 878 | 5036 |
| **Hockley County (Slaughter)—** | | |
| Honolulu Oil Corp., Slaughter 4-A-5 | 1732 | 4990 |
| Slaughter 12-B-24 | 1548 | 5025 |
| Sid W. Richardson et al, Coe 4 | 1032 | 4975 |
| Slaughter 9-B | 1272 | 4995 |
| Slaughter 10-B | 1377 | 4990 |
| Slaughter 12-B | 1449 | 4995 |
| Slaughter 13-B | 1104 | 4995 |
| Slaughter 25-B | 560 | 4963 |
| Tide Water, Pirkle 2 | 508 | 4985 |
| Texas Co., Slaughter 16 | 1329 | 5010 |
| Western States Gaso. Corp., Mallet 3 | 690 | 4996 |
| **Pecos County (Abell)—** | | |
| Magnolia, Markey 1-B | 1520 | 5424 |
| Sinclair Prairie, Daly 1 | 2349 | 5368 |
| **Pecos County (Payton)—** | | |
| Brandor Pet. Co., Dorr-Cities 5 | 121 | 2075 |
| **Pecos County (Tobarg)—** | | |
| Stanolind, Tippett 22-B | 72 | 475 |
| **Pecos County (Walker)—** | | |
| John Lewis et al, White-Baker 3 | 58 | 2136 |
| Shasta Oil Co., White-Baker 5 | 39 | 2084 |
| White-Baker 6 | 69 | 2095 |
| **Pecos County (Wildcat)—** | | |
| L. C. McKean et al, Iowa Realty 1 | * | 1787 |
| **Reagan County (Wildcat)—** | | |
| Henry Schooler et al, Walters 1 | * | 3045 |
| **Ward County—** | | |
| Gulf, Estes 145 | 618 | 2678 |
| O'Brien 169 | 215 | 2768 |
| **Winkler County (Emperor)—** | | |
| C. V. Lyman et al, Cowden-Cities Service 1-A | 474 | 2983 |
| **Winkler County (Keystone)—** | | |
| Sid Richardson et al, Jenkins-Southland 2 | 306 | 3440 |
| **Yoakum County (Wasson)—** | | |
| Don Donvers et al, Willard 4-B | 889 | 5297 |
| Honolulu Oil Corp., Hargett 1 | 149 | 5202 |
| Shell, Baumgart 16-B | 1351 | 5190 |
| T. P. Coal & Oil Co., Hall 8 | 973 | 5200 |
| **OLD WELLS DEEPENED** | | |
| **Cochran County (Deal)—** | | |
| Geo. Livermore (was Meeker et al), Wright 1 (otd 4997) | * | 6621 |
| **Yoakum County (Wasson)—** | | |
| J. W. Murchison et al, Fairman 3 (otd 5130) | 590 | 5215 |

## Southwest Texas

### CORPUS CHRISTI DISTRICT

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Colorado County (Garwood)—** | | |
| W. R. Davis, Inc., Brownson 1-B, opens Cockfield sand, west Garwood area | 900 | 6310 |
| **Hidalgo County (Nichols)—** | | |
| Baldridge & King, Yturria Town & Impr. Co. 2-C, new sand | 400 | 3931 |
| **Jackson County (Lolita)—** | | |
| Magnolia, Abbott 2 | 750 | 5942 |
| Skelly Oil, Ward 6 | 850 | 6413 |
| **Jackson County (West Ranch)—** | | |
| Magnolia, West 148-A | 900 | 5590 |
| West 151-A | 800 | 5570 |
| **Jim Wells County (Ben Bolt)—** | | |
| Bridwell Oil Co., Hoffman 2-C | 850 | 5205 |
| Hoffman 3-C | 900 | 5232 |
| **Live Oak County (Wildcats)—** | | |
| Humphries & Hotchkin, Hamilton Bros. 2 | * | 1638 |
| Moore Dev. Co., Briam 1 | * | 3102 |
| **Nueces County (Bentonville-King)—** | | |
| Southern Min. Corp., Walker 9 | 250 | 5690 |
| **Nueces County (Stratton)—** | | |
| Southern Min. Corp., Stratton-Community 16 | 275 | 6628 |
| **Refugio County (Tomoconnor)—** | | |
| Quintana Pet. Corp., Williams 27 | 1500 | 5925 |
| **San Patricio County (E. White Point)—** | | |
| Plymouth Oil Co., Owen 1-A | 500 | 5677 |
| **Victoria County (Wildcat)—** | | |
| W. Stewart Boyle, Ragsdale 1 | * | 6005 |
| **OLD WELL DEEPENED** | | |
| **Nueces County (Saxet Heights)—** | | |
| J. K. Culton, Baldwin et al 3(otd 4078) | 10 | 5170 |

### LAREDO DISTRICT

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Duval County (W. Casa Blanca)—** | | |
| Magnolia, D. C. R. C. 1 (88) | * | 1070 |
| D. C. R. C. 17(289) | 35 | 1013 |
| D. C. R. C. 18(289) | * | 1297 |
| **Duval County (Kreis)—** | | |
| Bridwell Oil Co., Escapule 1-B, extends field 1½ mi sw | 300 | 3212 |
| **Duval County (Driscoll)—** | | |
| Continental, Driscoll 65-A | 32 | 3394 |
| **Duval County (Hoffman)—** | | |
| Magnolia, Well 23(113) | ¶8.0 | 2733 |
| **Jim Hogg County (Colorado)—** | | |
| C. Andrade III, Trevino 1-H | 250 | 2928 |
| Humble, King Ranch-Colorado 14-B | 350 | 2900 |
| **Jim Hogg County (Manila)—** | | |
| Magnolia, Merchants Bank 47 | 84 | 2573 |
| **Jim Hogg County (Wildcat)** | | |
| V. F. Neuhaus & C. M. Lucky, Bute 2 | ¶6.0 | 3464 |
| **Starr County (Boyle)—** | | |
| Sun Oil, Chapa de Vela 2 | * | 3905 |
| **Starr County (Rincon)—** | | |
| Continental Oil et al, Slick Est 35-A | * | 4986 |
| Slick Est 36-A | 150 | 4376 |
| **Starr County (Sun)—** | | |
| Humble, Montalvo 4 | 250 | 4871 |
| **Starr County (Wildcat)—** | | |
| Navarro Oil Co., Garza 1 | * | 4500 |
| **Webb County (Glen)—** | | |
| Interstate Minerals, Lopez 54 | 358 | 2173 |
| **Webb County (Killam)—** | | |
| O. W. Killam, Garcia & Villareal 6 | 60 | 2060 |
| **Zapata County (Escobas)—** | | |
| Dulup Oil Corp, Garcia 6-C | * | 1114 |
| **OLD WELL DEEPENED** | | |
| **Duval County (Charamousca)—** | | |
| N. V. Duncan, Worden & Drought 21, (otd 1078) | 76 | 1500 |

### SAN ANTONIO DISTRICT

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Bexar County (Alta Vista)—** | | |
| A. V. Kurt Petzold, Kelso 2 | 4 | 1060 |
| **Bexar County (Gas Ridge)—** | | |
| Southwest Dr. Co., Covell et al 14 | 3 | 430 |
| **Bexar County (Wildcat)—** | | |
| R. C. Stanley, Gambler & Tessmann 1 | * | 1450 |
| **Caldwell County, (Wildcat)—** | | |
| Paul J. Bleakley, Elband 2 | * | 40 |
| **Dimmitt County (Wildcat)—** | | |
| Humble, Catarina Farms 1 | * | 6613 |

## North Texas

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Archer County (Wildcats)—** | | |
| Bass & Dillard, McGregor 1 | * | 5693 |
| W. B. Hamilton et al, Graham 1-C | * | 1975 |
| Geo. W. Cooper et al, Edwards 1 | * | 5324 |
| **Archer County (Griffin-Kadane)—** | | |
| Jack E. Kadane, Tr., Griffin 3-A | 1065 | 4346 |
| **Archer County (Hull-Silk)—** | | |
| Mrs. J. H. Massie et al, Wilson 8 | 340 | 3800 |
| **Archer County—** | | |
| Dillard-White-Duncan, Nichols 15 | * | 515 |
| Henry Grace et al, Wilson 2 | 125 | 1536 |
| Wilson 3 | 75 | 1539 |
| Young-Woody Dr. Co., Wilson 1, sec 114 | * | 1501 |
| John L. Webb et al, Montgomery 4 | 80 | 1113 |
| **Clay County (Worsham Deep)—** | | |
| Gulf, Scaling 1 (new pay) | 197 | 5814 |
| **Clay County (Wildcat)—** | | |
| L. T. Burns et al, Wines 1 | * | 5500 |
| Phillips, Duncan 1-Ct | * | 1300 |
| **Clay County (Antelope)—** | | |
| Shell, Henderson 16 | 537 | 3202 |
| **Clay County—** | | |
| Geo. Golden et al, Enyart 3 | 5 | 316 |
| C. Y. Gorman et al, Taylor 1-40 | 35 | 1137 |
| Gorman & Norwood, Taylor 7 | * | 1150 |
| **Cooke County (Walnut Bend)—** | | |
| Sinclair Prairie, McGeorge 20 | 194 | 4950 |
| **Cooke County—** | | |
| Metzner & McKee, Hess 2 | * | 845 |
| **Foard County (Alee)—** | | |
| H. B. Wallace et al, Gamble 1 | * | 2350 |
| **Jack County—** | | |
| Paul Steed et al, Helvey 1 | * | 3283 |
| **Montague County (Benton-Holmes)—** | | |
| L. S. Flannery, Inc., McLaughlin 2 | 40 | 3629 |
| **Montague County (Rogers & Rogers)—** | | |
| Carnation Pet. Co., MK&T Ry. 1-B (7.2-ac) | 1336 | 5255 |
| **Montague County—** | | |
| Claymont Oil Co., Bouldin-Crow 4-A | 10 | 819 |
| **Wichita County (K-M-A Ellenberger)—** | | |
| Fain-McGaha Oil Corp, Griffin 4-B-E | 2328 | 4330 |
| **Wichita County (K-M-A)—** | | |
| Deep Rock Oil Corp., Hamilton 9 | 624 | 3802 |
| King Oil Co., Waggoner Bros.-Gulf 7 | 380 | 3788 |
| **Wichita County—** | | |
| Akin-Dimock-Costley, Dodson 7 | 18 | 1322 |
| Oats 5-A | 25 | 1303 |
| J. W. Carter et al, Roller 1 | 8 | 494 |
| L. M. Cristaph et al, Fisher 1 | 6 | 859 |
| Coleman & Coppock, Warren 4 | 75 | 1769 |
| K. D. Harmon et al, Snow 1 | * | 2015 |
| Ted A. Norwood et al, Lessler 1 | 6 | 1350 |
| **Wichita County (Wildcat)—** | | |
| Chas. E. Morrison et al, Cooper 1 | * | 1355 |
| **Wilbarger County (Wildcat)—** | | |
| H. F. Wilcox O&G, Waggoner Est. 1 | * | 5056 |
| **Wilbarger County (Fargo)—** | | |
| Amerada, Goodpasture 2-B | 992 | 4030 |
| **Wilbarger County (Harrold)—** | | |
| Consolidated Oil, Waggoner Est. 1-HH | * | 3268 |
| **Wilbarger County—** | | |
| Staley-Wynne, Waggoner Est. 24-G | 10 | 1875 |
| **Young County (Wildcats)—** | | |
| W. F. Collins, et al, Moore 1 | * | 651 |
| H. H. Tucker et al, Freeze 1 | * | 750 |
| **Young County—** | | |
| Burma Pet. Co., Dunagan 7 | * | 977 |
| Graham Roy. Co., Keen 2 | 7 | 910 |
| J. W. Sparks et al, Gilbert 1 | * | 902 |
| R. J. Watson et al, Belknap Coal Co. 1 | * | 750 |
| **GAS INPUT WELL** | | |
| **Young County—** | | |
| Wise-Jackson et al, Cullers 4-A | * | 665 |
| **OLD WELL DEEPENED** | | |
| **Cooke County—** | | |
| Trumter Pet. Co., Andress 8 (otd 792) | 4 | 1270 |

## Texas Gulf Coast

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Brazoria County (West Columbia)—** | | |
| Texas Co., Hogg 98 | 319 | 2243 |
| **Brazoria County (Hastings)—** | | |
| Stanolind, Sneed 21 | 680 | 5675 |
| **Brazoria County (Old Ocean)—** | | |
| Harrison & Abercrombie, Osburn 3 | 300 | 10,490 |
| **Hardin County (Sour Lake)—** | | |
| H. F. Baker, Swayne 2 | 108 | 1592 |
| **Harris County (Pierce Junction)—** | | |
| Roxie Wright, Gulf-Jones 4 | 16 | 3800 |
| **Liberty County (Esperson)—** | | |
| General Crude, Davis 24 | 58 | 6037 |
| **Liberty County (Hull)—** | | |
| Guinn Crude Oil, Marshall 7 | 9 | 1134 |
| **Matagorda County—** | | |
| Horn Oil Co., Duke 1 | * | 920 |
| **Matagorda County (N. Markham)—** | | |
| Ohio Oil, Carlson 5 | 182 | 7980 |
| **Walker County—** | | |
| C. W. Markle, Davis 1 | * | 2016 |
| **Wharton County (Boling)—** | | |
| M. B. Cloud, Cloud 2 | * | 837 |
| **Wharton County (Withers)—** | | |
| Texas Co., Pierce B-73 | 52 | 5549 |

## West Virginia

| Company, Well and Location | Init. Prod. Bbls. | Depth |
|---|---|---|
| **Braxton County—** | | |
| Pitts. & W. Va. Gas, Pierson 1 | * | 2147 |
| **Calhoun County—** | | |
| Yoak & Brown, Church 1 | 10 | 1998 |
| **Gilmer County—** | | |
| Pitts. & W. Va. Gas, Wolf 7799 | ¶0.3 | 1586 |
| Knight & Whiting, Vannoy 2 | * | 2280 |
| **Kanawha County—** | | |
| Columbian Carbon, Robinson 1 | ¶9.0 | 5085 |
| **Putnam County—** | | |
| United Fuel Gas, Mabe et al 5002 | 50 | 1601 |
| Vaughn Gas Co., Vaughn 1 | ¶0.21 | 1863 |
| **Ritchie County—** | | |
| Carnegie Nat. Gas, Ballah 1 | ¶0.1 | 2020 |
| John R. Geho, Eddy Hrs. 1 | ¶0.07 | 1894 |
| **Upshur County—** | | |
| Pitts. & W. Va. Gas, Allman 7787 | ¶1.49 | 2225 |
| **Wayne County—** | | |
| Owens - Libby - Owens, Hoard-Baldwin 24 | ¶0.24 | 1710 |
| **Wood County—** | | |
| Miracle & Farnsworth, Duke 1 | 1 | 1604 |

## *Chocolate Bayou Rules*

The Texas Railroad Commission has issued an order providing for standard 40-acre spacing for wells in the Chocolate Bayou field, Brazoria County. Regulations call for 40-acre proration units, with allowable assigned on acreage and per-well, 75 percent on the acreage factor. As much as 80 acres can be assigned to one well, if the wells are drilled at least 2200 feet apart.

Each reservoir in the field is to be treated separately, that is, allowables will be assigned to each separate sand and divided among the wells producing from that sand.

The order calls for 2500 feet of surface casing set with 500 sacks of cement, and an oil string cemented 3000 feet above the shoe.

# WILDCAT REPORT
## New Starts and Completions

### CALIFORNIA
#### FIRST REPORTS

**Orange County**—Wilshire Annex Oil Co.'s Community 1, sec 14-3-11, foundation, West Coyote area.

**Sacramento County**—Superior Oil Co.'s Larsen 1, sec 8-3-3, lcn, Rio Vista area. Superior Oil Co.'s McCormac 1, sec 9-3-3, lcn, Rio Vista area.

#### COMPLETION

**Kern County**—Bankline Oil Co.'s No. 24-24, sec 24-11-23, td 4325 ft in fine gray sand (Etchegoin), steep dips, abnd, Maricopa area.

### IOWA
#### COMPLETION

**Taylor County**—Pryor & Lockhart & Stanolind's Marr Estate 1, c e½ ne sw 32-68n-33w, Lansing 288 ft, Bartlesville sd 1193 ft, hfw 1193-96 ft, Mississippi 1350-1620 ft, hfw 1395 ft, Hunton 1710 ft, hfw 1795 ft, Maquoketa shale 2378 ft, Viola 2458 ft, water, St. Peter (Wilcox) 2859 ft, water, Arbuckle 2882, hfw 2889 ft, abnd 2896 ft.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### KANSAS
#### FIRST REPORTS

**Barton County**—Black-Marshall Oil Co.'s Redetzke 1, c s½ sw nw 5-16-11w, dr.

**Ellsworth County**—Ingling & Parker's State 1-A, c sw sw 29-15-8w, dr.

**Graham County**—Palm-King Oil Co.'s Billips 1, sec ne 6-7-21w, dr.

**Norton County**—Shaffer & Hall- Jordan Oil Co.'s Van Mayrhauser 1, c n½ nw ne 26-5-22w, lcn.

**Rice County**—Herndon Dr. Co. et al's Timbers 1, nwc ne 8-21-8w, owpb, co 3522 ft.

**Russell County**—Cities Service's Beisel 1, nec nw 15-14-12w, dr. Central Pet. Co. et al's Waydziak 1, nwc 25-15-12w, dr. Central Pet. Co. et al's Steinle 1, c w½ nw ne 29-15-12w, rig.

#### COMPLETIONS

**Barton County**—Helmerich & Payne et al's Reidl 1, c e½ ne ne 10-17-14w, 5 mi w Ainsworth pool, Anhydrite 955 ft, Ft. Riley 1960 ft, Florence 2050 ft, Neva 2310 ft, Topeka 2920 ft, Lansing 3232 ft, Sooy 3432 ft, Arbuckle 3495 ft, abnd 3504 ft. Fred Steckel et al's Fee 1-A, c s½ sw ne 11-20-12w, Ellinwood West area, Anhydrite 695 ft, Arbuckle 3353 ft, filled 2200 ft water, abnd 3381 ft. R. W. Rine Dr. Co. et al's Hart 1, c w½ nw nw 9-20-13w, 2 mi s Great Bend, Anhydrite 725 ft, Topeka 2835 ft, Lansing 3220 ft, Sooy 3450 ft, Arbuckle 3494 ft, abnd 3524 ft.

**Ellsworth County**—Magnolia's Andrea 6, nw sw sw 7-17-10w, new horizon Breford pool, otd 3106 ft, Quartzite 3359 ft, td 3366 ft, shot 5 qts, 24 bbls.

**Rooks County**—Kerlyn & Phillips et al's Francis 1, c w½ nw se 31-9-17w, 5 mi n Burnett pool, Anhydrite 1385 ft, Ft. Riley 2125 ft, Neva 2460 ft, Topeka 3020 ft, Lansing 3320 ft, Sooy 3515 ft. Simpson Shale 3538 ft, Simpson Dolomite 3556 ft, Arbuckle 3584 ft, abnd 3630 ft.

**Russell County**—Central Pet. Co. et al's Machin 1, c e½ ne nw 9-13-14w, 2 mi n Russell pool, Anhydrite 840 ft, Topeka 2706 ft, Lansing 2980 ft, base Kansas City 3242 ft, Arbuckle 3265 ft, abnd 3285 ft.

**Sedgwick County**—Aylward Prod. Co. et al's Aylward 1, c e½ se sw 35-27-2e, 1½ mi w Andover South pool, Kansas City 2445 ft, hfw 2525-35 ft, Mississippi 2943 ft, hfw 2525-35 ft, Mississippi 2943 ft, hfw 3235-45 ft, Arbuckle 3307 ft, abnd 3324 ft.

**Stafford County**—Zephyr Dr. Co. et al's Shotten 1, c w½ nw se 28-23-13w, 1 mi n St. John, Anhydrite 1800 ft, Ft. Riley 1930 ft, Florence 2040 ft, Topeka 3020 ft, Lansing 3435 ft, Viola 3470 ft, Simpson 3795 ft, Arbuckle 3853 ft, heavy oil in fractures 3859-64 ft, abnd 3885 ft. Stanolind's Hill "B" 1, c n½ ne nw 11-23-12w, 6 mi s Drach pool, Anhydrite 582 ft, Lansing 3290 ft, Viola 3590-3600 ft, Simpson 3600 ft, Arbuckle 3664 ft, abnd 3707 ft. Stanolind's Charles 4, c n½ sw se 15-24-12w, new horizon Stafford pool, Anhydrite 656, Viola 3775 ft, Simpson 3883 ft, Arbuckle 3945 ft, td 3964 ft, pb 3812 ft, dr plugs 3959 ft, 500 gals acid, 1098 bbls.

**Trego County**—W. M. McNab et al's Krysi 1, c n½ nw ne 1-12-22w, 6 mi nw Gugler pool, Anhydrite 1792 ft, Ft. Riley 2550 ft, Neva 2890 ft, Topeka 3406 ft, Lansing 3644 ft, Sooy 4013 ft, Arbuckle 4043 ft, uncommercial, abnd 4070 ft.

### SOUTH LOUISIANA
#### FIRST REPORT

**St. Martin Parish**—Amerada & Phillips' State 1, Lake Chicot pros, sec 24-11s-9e, lcn.

#### COMPLETIONS

**Cameron Parish**—Superior's Miami Corp. 1, Pecan Lake pros, sec 29-14s-3w, td 10,883 ft, 7-in 10,555 ft, elec log, perf 10,174,184 ft, 2 bbls 46.1-gr oil and 2,250,000 ft gas per day, 18/64-in ch, tp 3650, casing sealed.

**St. Mary Parish**—E. G. Bateman Dr. Co. et al's Fost 1, workover, deepened from 10,481 ft to 10,991 ft, abnd.

### MICHIGAN
#### FIRST REPORTS

**Clare County**—Sun's McKenna 2, c s ne sw 15-19n-3w, lcn.

**Osceola County**—Chapman Oil Co.'s Seavey 1, c n se ne 4-19n-7w, rig.

#### COMPLETIONS

**Allegan County**—W. L. McClanahan's Graezyk 1, ne nw se 19-4n-12w, Traverse lime 1566 ft, abnd 1576 ft. Bridger Basin Oil Corp.'s Pollitt 1, sw se sw 6-2n-11w, Traverse 1699 ft, abnd 1715 ft.

**Calhoun County**—Floyd Skirvin's Hallock 1, 1, ne sw nw 14-3s-7w, Traverse 1453 ft, abnd 1458 ft.

**Midland County**—Sun's State 2, c n nw se 4-16n-1w, Dundee 3798 ft, so 3848 ft, abnd 4015 ft.

**Missaukee County**—Walter Heintz's McCoy 1, c w sw nw 2-21n-6w, Dundee 3847 ft, so 3847 ft, abnd 3862 ft.

### MISSOURI
#### COMPLETION

**Atchison County**—I.T.I.O. Co.'s McGinnis 1, c se sw 12-66n-39w, 18 mi ne Rockport, Lansing 505 ft, base Kansas City 790 ft, Mississippi 1675 ft, base Mississippi 1951 ft, Hunton 2190 ft, abnd 2301 ft.

### NEBRASKA
#### FIRST REPORT

**Gage County**—Nelson Dr. Co.'s Ideus 1, c w½ e½ sw 5-4n-7e, mim.

### NEW MEXICO
#### FIRST REPORT

**Lea County**—William D. Flynn et al's Evans 1, swc se 18-17s-25e, lcn. Nick Manetas et al's Lane 1, c se ne 13-21s-28e, sp.

### OKLAHOMA
#### FIRST REPORTS

**Pottawatomie County**—Helmerich & Payne's School Land 1, nwc ne 16-7n-5e, dr.

**Seminole County**—Mico O. & G. Co.'s Kidd 1, ne sw se 33-10n-8e, rig.

#### COMPLETIONS

**Hughes County**—H. O. Pope et al's Manahan 1-A, nec nw 30-4n-9e, 2 mi w Citra pool, Gilcrease 2540-2650 ft abnd 3303 ft.

**Lincoln County**—Wilcox O. & G. Co.'s Curry 1, nec nw 8-15n-5e, 1 mi w Kendrick, Hogshooter 2410 ft, Checkerboard 2740 ft, Cleveland 2770 ft, Oswego 3412-79 ft, Prue 3488 ft, Verdigras 3540 ft, Brown lime 3958 ft, Mayes 4069 ft, td 4100 ft, pb 3495 ft, hfw, abnd 4100 ft.

**Payne County**—Gardner Pet. Co. et al's Lowry 2, c n½ se sw 12-19n-1w, 4 mi e Orlando Pool, revives East Orlando pool, Avant 3010 ft, Dewey 3170 ft, Oswego 4185 ft, Mississippi 4640 ft, Chatt 4691 ft, Misener 4720 ft, td 4747 ft, 177 bbls 41.7-gr.

**Osage County**—W. R. Dillard et al's Osage 1, se nw nw 22-21n-9e, 1 mi n Ohio Osage pool, Cleveland sd 1680-1736 ft, Big lime 1932-46 ft, Oswego 1971-2032 ft, Verdigras 2080 ft, Pink lime 2235-40 ft, Bartlesville ls 2433-47 ft, Mississippi 2540 ft, Chatt 2814 ft, base Chatt and top Ordovician 2830 ft, Arbuckle 2950 ft, abnd 2988 ft.

**Pottawatomie County**—Hall-Jordan Oil Co.'s Whitehead 1, c w½ se sw 36-10n-3e, Tecumseh Lake pool disc, Hogshooter 3053 ft, Checkerboard 3440 ft, Belle City 2600 ft, Mayes 3760 ft, Woodford 4870 ft, Hunton 5008 ft, Sylvan 5014 ft, Viola 5118 ft, Sense 5151 ft, Dolomite 5186 ft, Wilcox 5234 ft, td 5245 ft, 1078 bbls, 1-in ch on 2½-in tub, 38-gr.

**Seminole County**—Magnolia's Davis 1, sw se ne 16-8n-8e, new horizon East Wewoka pool, otd 3235 ft, Hunton 3940 ft, Second Wilcox 4269 ft, td 4282 ft, perf csg in Hunton, 6000 gals acid, 20 bbls.

### TEXAS GULF COAST
#### FIRST REPORTS

**Harris County**—Tillson Constr. Co.'s Swilley 1, se part Victor Blanco sur, 391-ac tr, nw Sheldon, lcn.

**Lee County**—Shell's Brown 2, Tanglewood area, 990 ft nw Brown 1, Robt. Finney sur, clearing lcn.

**Orange County**—W. M. Dickey's Teel 1, ne Beaumont in nw Orange County, se corner Thos. N. Breece sur A-3, lcn.

#### COMPLETIONS

**Matagorda County**—Horn Oil Co.'s Duke Est. 1, Ira Ingram lge, 7 mi n Matagorda, abnd 920 ft.

**Walker County**—C. W. Markle's Davis 1, 14 mi sw Huntsville, James Ford sur, abnd 2016 ft.

### WEST CENTRAL TEXAS
#### FIRST REPORTS

**Callahan County**—Merry Bros. & Perini's DeSpain 1, se 176-ac tr, S. P. Ry. sec 32, blk 8, rur.

**Jones County**—Chas J. Kleiner et al's Jackson 1, 140-ac tr, subd 9, Alex Thompson sur 20, mim.

**Palo Pinto County**—W. K. Gordon et al's Crouch-Mickson 1, n½ T&P Ry sec 8, blk 3, elev 1076 ft, lcn for 3500-ft test.

#### COMPLETIONS

**Bosque County**—T. B. Kendrick et al's Beeker 1, Geo. Island sur, abnd 507 ft.

**Brown County**—Central Texas Gas Co.'s Smith 1, jkd 1868 ft.

**Callahan County**—H. R. Clay-Fred Heyer's Hennessy 1, ne sw BBB&C sec 83, abnd 1820 ft.

**Palo Pinto County**—P. F. Cole et al's Crawford 1, ne nw TE&L sec 888, abnd 2210 ft. Elgin P. Wilson et al's Watson 1, T&P sec 10, blk 2, abnd 4065 ft.

**Shackelford County**—B. & F. Bonded Warehouse Co.'s Snyder 1, L. A. L. sec 32, abnd 850 ft. J. W. Keys et al's Shalley 1, E. T. Ry. sec 13, abnd 891 ft.

## EAST TEXAS

### FIRST REPORTS

**Freestone County**—Westbrook & Whistler's Coleman 1, 97-ac tr, H. Howard sur, 2½ mi sw Streetman, lcn.

**Henderson County**—British-American O. P. Co. et al's Texie Young 1, SWc of 490-ac tr, Joseph Rice sur, rur.

### COMPLETIONS

**Cherokee County**—American-Liberty Oil Co.'s Austin 1, nwc 156-ac tr and Z. Batten sur, elev 294 ft, Pecan chalk 3421-3840 ft, Austin chalk 4456 ft, abnd in Woodbine water sand 4735-48 ft.

**Freestone County**—Carter-Gragg Oil Co.'s Mims-Arkansas 1, se part 100-ac tr, J. M. Lyons sur, Butler dome, Pecan chalk 3320-3525 ft, Austin chalk 4497-4760 ft, Woodbine series 5197 ft, sand 5247 ft, abnd 5254 ft.

**Morris County**—C. B. Zuber et al's Blackburn 1, nw part 100-ac tr, Ensign B. Smith sur, elev 290 ft, Pecan chalk 3090 ft, Austin chalk 3940-4325 ft, Woodbine 4160 ft, Georgetown 4325 ft, Paluxy 5504 ft, abnd 5676 ft.

## NORTH TEXAS

### FIRST REPORTS

**Archer County**—Bridwell Oil Co.'s Bridwell 1, sw nw TE&L sec 1827, lcn.

**Clay County**—Phillips Pet. Co.'s Duncan 1, blk 17, Bacon subd, abnd 1300 ft.

**Cooke County**—Harvey Dr. Co.'s Ware 1, 68-ac, W. W. Crisp sur A-221, rur. Sinclair Prairie's Marshall 1, Alex Horton sur A-443, mim. Seitz-Comegys & Seitz's Cooke 1, S. W. McKneely sur A-636, lcn. C. J. Bohner's Wickliffe 1, nec of s½ of center 80-ac tract in I. Gable sur, A-420, 7 miles nw Muenster, lcn.

**Jack County**—Ambassador Oil Corp.'s Shawver 1, J. Turner sur A-609, lcn 5500-ft test.

**Montague County**—Seitz-Comegys & Seitz's Geurin-Shell 1, nec of 75-ac tr, NEP&P sec 53, A-526, near e edge county, lcn.

**Wichita County**—Paul B. Scott et al's Horn 1, nec sw¼ north 160 ac of south 200-ac tr, W. H. Anderson-M. Gilbert surveys, lcn. Staley Oil Co.'s Carden 1, swc Wm. Anglin sur A-2, sp. Hanlon & Buchanan, Inc.'s Denny 1, swc blk 27, W. Graves sur. A-81, lcn deep test.

**Young County**—D. P. Holland et al's Morris 1, se sw TE&L sec 254, lcn.

### COMPLETIONS

**Archer County**—Bass & Dillard's McGregor 1, nwc E. Goodwin sur A-1135, Bend 5255 ft, Mississippian 5473 ft, Ellenberger 5500 ft, abnd 5693 ft. W. B. Hamilton et al's Graham 1-C, F. Gibenrath sur A-136, Gunsight lime 1093-95 ft, abnd 1975 ft. Geo. W. Cooper et all's Edwards 1, nec blk 20, Geo. Bruner sur A-8, Bend 5290 ft, abnd 5324 ft.

**Clay County**—L. T. Burns et al's Wines 1, nec lot 1, blk 1, Halsell subd, Bend 5432 ft, abnd 5500 ft. Phillips Pet. Co.'s Duncan 1-CT, blk 17, Bacon subd, abnd 1300 ft. Gulf's Scaling 1, ne nw nw T&NO sec 3, new and deep pay in abandoned sector Worsham pool, Bend 5600 ft, Ellenberger 5766 ft. td 5814 ft, used 5000 gals acid in Bend-Ellenberger saturation, swab and flowed 197 bbls oil, 285 bbls water.

**Wichita County**—Chas E. Morrison et al's Cooper 1, m/s/nec blk 3, H. Hastie sur A-92, abnd 1355 ft.

**Wilbarger County**—H. F. Wilcox O&G Co.'s Waggoner Est. 1, sw sw H&TC sec 43, blk 2, Canyon 2810 ft. K-M-A Strawn lime 4105 ft, Bend 4324 ft. Mississippian 4828 ft, detrital 4896 ft. Ellenberger 4900 ft, abnd 5056 ft.

**Young County**—W. F. Collins et al's Moore 1, D. Franklin sur A-1599, abnd 651 ft. H. H. Tucker et al's Freeze 1, se sw TE&L sec 1443, abnd 750 ft.

## SOUTHWEST TEXAS

### FIRST REPORTS

**Bee County**—W. D. Walton et al's Tostenson 1, John Van Bibber sur, 1 mi w Normanna, lcn 8500-ft test.

**Caldwell County**—Nienaber et al's Elband 1, Solomon Seal sur, 1 mi w Luling, lcn 2500-ft test.

**Dimmitt County**—Roy R. Mogford's Barnard 1, J. J. Blair sur, 2 mi w Carrizo Springs, lcn 2500-ft test.

**Duval County**—Hiawatha O&G Co.'s Vaello 1, San Andres gr, 1 mi ne N. Sweden fld, dr. 1335 ft on 4800-ft test. J. W. Owen's Carrillo 1, John S. Givens sur 372, 6 mi nw Benavides, lcn. J. L. Scott's N. Saenz 1, BS&F sur 526, 11 mi nw San Diego, sp 4400-ft test.

**Jackson County**—Humble's Bennett 1, Valentin Garcia A-24, 3 mi w Vanderbilt, lcn 8000-ft test. Moore & Ahern's Mauritz 1, B. J. White Lge, ab 81, 6 mi se Ganado, lcn 7000-ft test.

**Jim Hogg County**—Sun's East 5, J. H. Sharp sur 793, lcn.

**Lee County**—Shell's Brown 2, Robert Finney sur, lcn 6000-ft test.

**Live Oak County**—Brauer, Beacham & West's Atkinson 1-b, Louis Ayers sur, lcn 1000-ft test.

**San Patricio County**—F. A. Gillespie & Sons Hunt 1, Gregory Farm, Blk "A", 2 mi ne Gregory, ru 7000-ft test.

**Starr County**—J. L. Collins & Co.'s Guerra 2, San Jose gr, 2 mi s LaReforma, lcn 6500-ft test. Continental's T. B. Slick Est. 95-B, CCSD & RGNG sur 222, 1 mi s Rincon fld, mi 4500-ft test.

**Victoria County**—John W. Mayo & W. Stewart Boyle's Smith 1, J. Diego Garcia sur, Ab 39, 6½ mi se Victoria, mir 6000-ft test.

**Webb County**—Harold K. Boysen's Bruni Est 1, sur 164, 6 mi sw Bruni, mi 2800-ft test. W. F. Houser & R. F. Campbell's de Benavides 1, sur 702, 5 mi nw Bruni, lcn, 2500-ft test.

### COMPLETIONS

**Bexar County**—R. C. Stanley's Gembler & Tessman 1, J. Montez gr, 10 mi se San Antonio, abnd 1450 ft.

**Caldwell County**—Paul J. Bleakley's Elband 2, Solomon Seal sur, 2 mi nw Luling, abnd 40 ft.

**Colorado County**—W. R. Davis, Inc.'s Brownson 1-B, A. B. Fisk sur, ab 824, Garwood area, 2750 ft ne No. 1-A, 331 bbls, 3/16-in ch, tp 920 lbs, cp 1040 lbs, perf 6104-08 ft, fr 41.9, no sw, 1.2% mud, gor low, 7-in casing 616 ft, td 6310 ft, top sand 6102 ft, opens Cockfield sand, West Garwood area.

**Dimmitt County**—Humble's Catarina Farms 1, T&NORR sur 57, 3 mi nw Catarina, abnd 6613 ft.

**Duval County**—Bridwell Oil Co.'s Escapole et al 1-B, G. H. and H. sur 75, 7 mi e Freer, 148.5 bbls, ¼-in ch, tp 90 lbs, cp 240 lbs, gr 30.6-66 octane, water none, gor 241/1, 7-in casing 3204 ft, top sand 3204 ft, td 3212 ft, extends Kreis fld 1½ mi sw.

**Hidalgo County**—Baldridge & King's Yturria Town & Impr. Co. 2-C, Royal O&G subd of 503-ac tr, in Nichols area, 116.61 bbls, ¼-in ch, tp 400 lbs, cp 650 lbs, perf 3903-12 ft with 20 shots, gr 37.6, water none, 5½-in casing 3927 ft, new sand.

**Jim Hogg County**—V. F. Neuhaus & C. M. Lucky's Bute et al 2, Pippin subd, El Randado gr, 5 mi se Randado, shut in, gas well, si pres 1100 lbs, perf 2855-63 ft with 24 shots, 5½-in casing 2910 ft, new fld.

**Live Oak County**—Humphries & Hotchkin's Hamilton Bros. 2, H&GN sur 3, 3 mi ne Three Rivers, abnd 1638 ft. Moore Dev. Co.'s Briam 1, Dennis McGowan sur, ab 29, 1½ mi se Oakville, temp abnd 3102 ft.

**Nueces County**—Phillips Pet.'s Mastin 1, Delores I&A sur, 5 mi sw Clarkwood, abnd 7765 ft, perf 6605 ft, dst rec 3720 ft, sw, oil odor, 5 lbs pres, 15 minutes.

**Starr County**—Navarro Oil Co.'s Garza 1, ACH&B sur 163, ab 200, w Rincon fld, abnd 4500 ft. Sun's Chapa de Vela 2, Josefa Benavides Por 91, ab 41, 9 mi ne Rio Grande City, abnd 3905 ft, electric log.

**Victoria County**—W. Stewart Boyle's Ragsdale 1, Valentin Garcia gr, ab 45, 4 mi s Inez, abnd 6005 ft.


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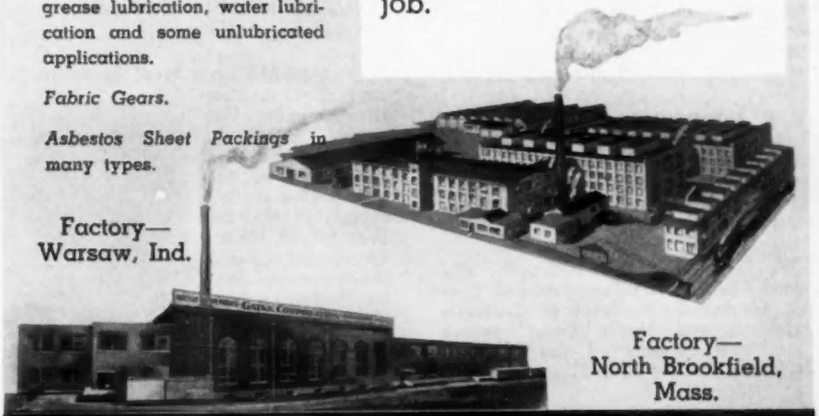

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# MEN IN THE INDUSTRY'S NEWS

**HAROLD M. McCLURE,** Alma, legislative secretary of the Oil & Gas Association of Michigan, last week was re-elected chairman of the Michigan State Oil Advisory Board to become its head for the third time. Active as a contractor and producer in Michigan since 1929, he is credited as one of the key-note men in gaining enactment in 1939 of the state's first oil-conservation law.

W. P. Clarke, Gulf Refining Company, was re-elected secretary of the board, and previously, E. H. Clagett, The Pure Oil Company, Saginaw, and C. A. Smith, Jr., Smith Petroleum Company, Grand Rapids, were reappointed for three-year terms.

**J. C. BERTRAND** and associates, San Antonio, have formed Imperial Core Drilling Company and have opened offices at 424 Milam Building, San Antonio. J. W. Sewell and Langston Smith also are associated in the company.

**R. B. ROBERTS,** West Virginia drilling contractor and producer, has been in San Antonio on a business trip. He has been spending considerable time at Pasadena, Texas.

**THOMAS S. WEST,** geophysicist of Three Rivers, is back on the job after an illness of several months.

**RAYMOND R. RUSSELL,** president of Phoenix Refining Company and Russell Oil Company, has moved his office to the Milam Building, San Antonio.

**H. C. WIESS,** president of Humble Oil & Refining Company, Houston, was in New York last week in conference with officials of Standard Oil Company, (New Jersey).

**FRED SEALY,** manager of the foreign production department of The Texas Company, has left New York on an inspection trip in Colombia and Venezuela. He is expected to return in June.

**GUY S. CONNORS,** Williams Brothers Corporation, will give an illustrated discussion on construction of Southeastern Pipe Line Company's line through Florida and Georgia before the Engineers Club of Tulsa, May 26.

**C. W. TOMLINSON,** Ardmore, discussed "Recent Developments and Current Geological Problems of Southern Oklahoma and North Texas" before a technical meeting of the Shawnee Geological Society May 22.

**CHARLES A. LESTER,** 47, president of Lester & Duffield, Inc., with properties in East Texas field, died May 15 at Dallas, where he had resided for a decade. He was a native of Columbus, Kansas, and received a law degree at Denver University. He practiced law in Oklahoma and Texas, and for the past 15 years was engaged as an oil producer.

**PAUL E. FITZGERALD,** Dowell Incorporated, Tulsa, will discuss "Advanced Practices in Acidizing Oil and Gas Wells," before the Seminole (Oklahoma) chapter of the American Petroleum Institute's Division of Production May 26. The meeting, which will feature election of officers, will be held at the N-K Cafe and be preceded by a dinner.

**CHARLES O. ROSSER,** formerly in charge of the accounting division for Pace Petroleum Company, Duncan, Oklahoma, and later an independent oil operator at Wichita Falls, has moved to Tulsa where he will practice petroleum accounting with a temporary office at 1204 Hunt Building.

**R. A. WRIGHT,** production superintendent for Sinclair Prairie Oil Company at Carmi, Illinois, has been transferred to the Wyoming district. J. T. Reeves replaces Wright in Illinois.

**EUGENE C. REED,** assistant state geologist for Nebraska, discussed "Geologic Phases of Recent Oil Development in Southeast Nebraska" before a recent meeting of The Tulsa Geological Society.

**JOE PURZER,** geologist with Phillips Petroleum Company, discussed "Geology and Development of Southern Arkansas and Northern Louisiana" before the technical meeting of the Oklahoma City Geological Society.

**WARD W. KELLEY** is in charge of the entertainment committee for the joint picnic of South Texas geological and scouting organizations, to be held June 7 at Starcke Park, Seguin. Assisting him are W. W. Henderson, L. A. Douglas, Leavitt Corning, Jr., Stuart Mossom, Robert Kolm and L. B. Snider.

A medal-play handicap golf tournament for the H. H. Weinert trophy is being arranged by Julius Schmotzer. The day's program will also include tennis, badminton, baseball and swimming. Supper will be served.

**JAMES COOMBE** has been elected president of Wm. Powell Company, Cincinnati. With the exception of 2½ years he served over-seas as artillery captain in the first World War, he has been associated with the company since his graduation from Yale University in 1910. Other officers elected are Harry H. Coombe, board chairman and treasurer; George E. Weitkamp, first vice president and secretary; David M. Forker, Oliver F. Gang, William E. Heilig and E. R. Noll, vice-presidents, and William E. Minor, Jr., assistant to the president.

**R. O. GARRETT,** Arkansas Fuel Oil Company, last week was named chairman of the Ark-La-Tex Chapter of the American Petroleum Institute's Division of Production. Active in institute affairs for some time, he served on the general arrangements and the entertainment committees for the recent spring meeting of the institute's Southwestern Dictrict. E. L. Rawlins, Union Producing Company, and W. B. Powers, Magnolia Petroleum Company, were named vice chairmen, and George Weber, secretary treasurer. Named for two-year terms to the chapter's advisory committee were A. M. Crowell, W. E. Schoeneck, J. T. Goodman and C. Mangold, while J. J. Formmer, O. O. Basley, R. A. Howe and Lon Abney were named for one-year terms.

**W. H. MEIER,** The Atlantic Refining Company, Dallas, has been re-elected chairman of the Central Committee on District Activities of the American Petroleum Institute's Division of Production. D. T. Ring, Preston Oil Company, Columbus, Ohio, is the new vice chairman, and C. A. Young, of the institute's staff, is secretary.

Members of the 1941 committee are B. H. Robinson, General Petroleum Corporation of California, Los Angeles; O. W. Van Petten, Columbian Carbon Company, Charleston, West Virginia; George Berlin, Skelly Oil Company, Pampa, Texas; E. P. Hayes, The Texas Co., Houston; R. N. McMaster, Chanslor-Canfield Midway Oil Company, Los Angeles; J. J. Schmidt, The East Ohio Gas Company, Cleveland; H. E. Miller, Lario Oil & Gas Company, Wichita; Chase E. Sutton, The Pure Oil Company, Houston; John R. Suman, Humble Oil & Refining Company, Houston; E. L. Adams, General Petroleum Corporation of California, Los Angeles; C. R. Weidner, Sinclair Refining Company, Independence, Kansas; M. E. Brock, Gulf Oil Corporation, Houston; R. E. Donovan, Standard Oil Company of California, San Francisco; M. Albertson, Shell Oil Company, Houston, and George P. Bunn, Phillips Petroleum Company, Bartlesville.

**C. A. JOHNSON,** Holly Oil Company, Los Angeles, was a business visitor in Houston last week.

**T. E. SUTTER,** Baker Oil Tools, Inc., Los Angeles, president of the Nomads board of regents, and E. L. Decker, Martin-Decker Corporation, Long Beach, past president, were presented with scrolls during a meeting of Nomads held last week at Tulsa during the semi-annual convention of the American Petroleum Institute.

W. G. Skelly, president of the International Petroleum Exposition, presented awards to the Houston, New York, Los Angeles and Tulsa chapters for their part

**Pictured are a group of Nomads who were among those banqueted by the International Petroleum Exposition in Tulsa last week. From left to right are Rex Hamaker, who received an award from the Tulsa show on behalf of the Houston chapter; E. L. Decker, past president of the national board of regents; Fred E. Cooper, who received an award on behalf of the Tulsa chapter; T. E. Sutter, president of the national board of regents; M. E. Montrose, representing the Los Angeles chapter; George Eichler, New York chapter, and Ray L. Dudley, Houston.**

in increasing attendance of foreign delegates at the 1940 exposition. A special award was given a representative of Braden Steel Corporation, Tulsa, honoring the late W. R. Braden, who donated the foreign delegates building at the exposition grounds.

W. G. Green, Engineering Laboratories, Inc., and president of the Tulsa chapter, presided at the dinner. A. E. Narramore, American Institute of Mining & Metallurgical Engineers, told of the standardization effort of the American Petroleum Institute, and of the use of the institute's specifications on equipment in foreign operations. W. B. Way, general manager of the International Petroleum Exposition, spoke of the assistance given the show by Nomads.

**R. B. DOWNING,** Mid-Continent consulting geologist, has joined Lane-Wells Company as sales engineer-geologist with headquarters in the Union National Bank Building, Wichita. Downing attended the Colorado School of Mines for three years and was graduated by the University of Oklahoma with a B.S. degree in 1925. After graduation, he spent two years in mining work, and since 1927 has been engaged in geological engineering work for the oil industry.

**W. G. SKELLY** was re-elected president of the International Petroleum Exposition at the annual meeting of the board of directors held in Tulsa last week, and plans were formulated for the twelfth show to be held May 16-23, 1942. Skelly has served as president since 1926. Other officers re-elected were Franks J. Hinderliter and Alf G. Haggen, vice-presidents; Clyde H. Pape, treasurer, and Frank O. Prior and M. W. Bovaird, executive committee members. William B. Way, general manager, announced that 59.8 percent of the space for the 1942 show has been reserved, which is the first time in the history of the show that such a large amount has been taken a year in advance. Officers and directors stressed the fact that the show will be more important than ever during the time of stress the nation is now undergoing, since it serves to acquaint the industry with the latest methods and equipment—a necessary factor in a period when cheaper, quicker, and better ways of producing oil are sorely needed.

**LEE H. HILL,** former assistant manager of the electrical department of Allis-Chalmers Manufacturing Company, Milwaukee, has been named a vice president and head of a newly created industrial relations department. He will be in charge of collective bargaining, grievance procedure, employment, wage policies and levels and all other subjects bearing on management-employe relations. W. C. Van Cleaf continues to work in industrial relations, reporting to Hill.

**AMON G. CARTER,** Fort Worth producer and publisher, was presented with a 38-foot de luxe sedan cruiser at a surprise party staged May 10 at Ed. Landreth's Eagle Mountain Lake. The gift was made by Fort Worth oil and business men.

**JAMES M. CONAWAY,** production foreman for The Carter Oil Company, Cromwell, Oklahoma, and Frank P. Colby, chief file clerk, lease records division of exploration department, Tulsa, both retired recently because of ill health. Conaway had over 18 years service, while Colby had exceeded 19 years.

**M. J. WARNOCK** has been named director of advertising and promotion for Armstrong Cork Company, Lancaster, Pennsylvania, under a new expanded advertising department that now covers all promotional activity. He succeeds John P. Young, resigned, and is to be aided by E. Cameron Hawley as assistant director of advertising and promotion. Warnock joined the company in 1926, spending 3½ years in the Seattle


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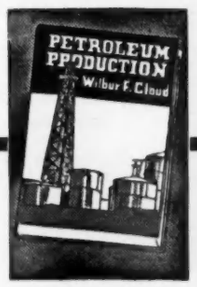


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# MEN IN THE INDUSTRY'S NEWS

district as salesman and later as district manager. He later was assistant manager of the floor division, and earlier this year was named assistant general sales manager. Hawley joined the company in 1927 as a member of the advertising department. He was later assistant sales manager of the Corkwood division, director of commercial research, and since 1936 has been director of the bureau of retail merchandising for the floor division.

**GARLAND C. RICHARDSON,** engineer for Indian Territory Illuminating Oil Company, Bartlesville, was elected chairman of the Southwestern section, Society of Automotive Engineers, at the annual dinner meeting of that organization held recently in Tulsa. He succeeds C. S. Hansen, Phillips Petroleum Company. Other officers elected were H. G. Bennett, Mid-Continent Petroleum Corporation, vice chairman; W. F. Lowe, Natural Gasoline Association, secretary; Fred Hunt, Continental Oil Company, chairman of papers committee, and Carl Tangner, Diesel Power Company, Oklahoma City, membership committee chairman.

**HOYT SHERMAN,** general manager of Mene Grande Oil Company at the company's San Tome camp in eastern Venezuela, reached New York this month for a vacation.

**D. H. CADDEL,** drilling and production superintendent for Mene Grande Oil Company in eastern Venezuela, is in south Texas on his vacation.

**J. W. BRADBURY,** district manager of Mene Grande Oil Company in the Maracaibo district of Venezuela, recently made a hurried trip to New York, and has since returned to Venezuela.

**J. B. HALSTEAD,** scout for Sun Oil Company, has been placed in charge of a South Georgia office opened by the company in Waycross.

**J. R. MOORE** has resigned as engineer for Oklahoma Natural Gas Company, Tulsa, to become chief engineer for Billings Gas Company, Billings, Montana.

**ROLEY C. McCARTER,** 49, West Central Texas operator with residences at Cisco, Texas, and San Diego, California, died May 12 in the latter city.

**C. E. REYNOLDS,** former manager of The Bovaird Supply Company's store at St. Elmo, Illinois, has been named manager of a new Illinois Basin store opened at Benton, which is also being used as headquarters for L. W. Bartheld, assistant Illinois district manager, Bartheld, former manager of the company's store at Salem, Illinois, has been succeeded in that position by C. E. Pearson, former

C. E. Reynolds

V. P. McAnally

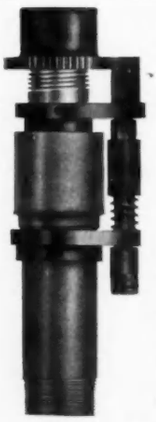
C. E. Pearson

field salesman. V. P. McAnally, Illinois district manager, continues to make his headquarters at Mt. Vernon.

**FRANK EDGAR JONES,** 63, board chairman of Mission Oil Company, died May 21 in Kansas City. A graduate of Northwestern University, he spent 19 years in the insurance business. In 1921, with three brothers, he organized Mission Oil Company, and developed extensive holdings in Kansas and Texas. He was made board chairman in 1937. He also was president of Lotus Oil Company, a director of Gas Utility Holding Company, and chairman of Trojan Oil Company.

**DON PRESCOTT,** production department of Shell Oil Company, has been transferred from Tulsa to Wichita. Other transfers in the production department are Frank Lee from Avant, Oklahoma, to Wichita Falls; Charles Teel, from Tulsa to Stroud, Oklahoma; Pablo Mendoza, from Tulsa to Houston; Tom Steel, in the Tulsa office between transfers, and Henry F. Renfrow, from Tonkawa, Oklahoma, to Tulsa.

**CARL E. STOLKER** and Roland S. Powers, geophysical department for The Carter Oil Company, Tulsa, have been transferred to the engineering department of the Oklahoma Pipe Line Company.



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# Squeaks from the Bull Wheel

### Only That

"What good," asked the angry would-be passenger, "are the figures set down in these railway timetables?"

"Why," patiently explained the genial agent, "if it weren't for them figures we'd have no way of findin' out how late the train is."

### Knowing Soldier

"Now, suppose you are on your post one dark night. Suddenly a person appears from behind and wraps two arms around you. What will you call, then?"

"Let go, Honey."

### Wasted

"Did you enjoy your day at the seaside?"

"No, I didn't; all the picture houses was full, so we had ter wander around the beach, and watch the ships all day."

### No Encouragement

"Sam, I hear you and Rastus almost had a fight."

"Yassah, boss, we all would 'a' had a terrible fracas, only they wasn't nobody there to hold us apart."

### Lofty Aim

Robert, what are you going to do when you grow up?

I'm going to be a grandfather and just sit around telling everybody how cold the winters were when I was a boy.

### Silent Drive

Say, your car does run smoothly.

Thanks, but just a minute; I haven't started the engine yet.

### A Different Language

George Ade was once traveling with a friend in the Orient, when the latter became involved in an argument with an elderly Arab.

Later, the friend, who had spent several years learning Arabic, complained: "It wasn't enough for the old fellow to give me an argument. He talked so outlandishly I couldn't understand half he said."

"Oh, never mind," counseled Ade. "You didn't notice, did you, that the old duffer hadn't a tooth in his head? So you see, while you were speaking Arabic, he was really speaking gum-Arabic."

### Heard at Camp

Can you lend me a dollar? I don't get paid until tomorrow.

Sorry, I haven't a cent. I was paid yesterday.

### Close Resemblance

The boss told us when he was a boy on a farm they had a mule that was just like one of the family.

Yeah, and I know which one.

### Identified

Halt; who's there?

American.

Advance and recite the second verse of "The Star Spangled Banner."

I don't know it.

Proceed, American.

### Editor's Note: It Does Happen

The typographical error is a slippery
thing and sly;
You can hunt till you get dizzy, but it
somehow will get by.
Till the forms are off the presses it is
strange how still it keeps;
It shrinks down into a corner, and it
never stirs or peeps.
That typographical error, too small for
human eyes,
Till the ink is on the paper, when it
grows to mountain size.
The boss, he stares with horror, then
he grabs his hair and groans;
The copy reader drops his head upon
his hands and moans—
The remainder of the issue may be
clean as clean can be,
But that typographical error is the only
thing you see.

### It's an Original Idea

Groom — You bought carpet and potted palms for the garage?

Bride—Yes, I want our new car to look just as nice in our garage as it did in the auto showroom.

### So They Say

What has become of that watch you used to carry—it had such a handsome gold case? Now you have one with a brass case.

Yes; you know circumstances alter cases.

### Knew the Hat

You tipped your hat to that lady. Do you know her?

No, but I'm wearing my brother's hat, and he knows her.

### Happy Group

Three little girls sent out of London found a new home at a farmhouse. They asked to be allowed to share the same room. Their hostess agreed, and one of the girls wrote home jubilantly:

"We have dogs and calves and horses and pigs and cows and chickens—and we all sleep in the same room."

### In Full Accord

I don't suppose you know what good honest work is?

No, I don't. What good is it?

### 'Zamination Time

"William, what are the two genders?"

"Masculine and feminine. The feminine are divided into frigid and torrid. the masculine into temperate and intemperate."

### Fair Wages

A tourist once asked an Indian what he did for a living.

"Me preachum."

"That so? What do you get for preaching?"

"Me get ten dollars a year."

"Well, that's poor pay."

"Umph! Me poor preacher."

### More Scotch

Donald McCautious sat with his arm around Mary McThrifty. It was a night for love.

His heart was stirred by sentiment. He longed to do something wild and bold, to say something romantic and passionate and startling. Suddenly he was swept from all reasoning by a wave of overwhelming inspiration.

"Mary," he gasped, before he could resist the frenzied impulse of the idea, "Mary! A penny for your thoughts!"

The girl's heart fluttered. So he loved her as much as that? She, too, would do something noble and heroic, he would know his love was requited.

"Na, na, Donald," she whispered, "keep your penny."

Such is true love.

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# NOTES FOR THE Equipment Buyer and User

## Sucker-Rod Coupling

**W. C. NORRIS, MANUFACTURER**

A sucker-rod coupling employing zinc to combat electrolysis and corrosion rods and tubing has been announced by W. C. Norris, Manufacturer, Tulsa.

The couplings, designated Defender, are used on the sucker-rod string in place of the ordinary coupling. In combating electrolysis and corrosion, the zinc of the couplings are attacked first, leaving the rods and tubing in tact. The greater affinity of zinc to acid spends the strength of the acid or the electrolytic dispositional current is dissipated before the metal of the sucker rod is attacked or corroded.

A reinforcing medium is employed in the coupling to hold the zinc in place and to prevent sluffing off as electrolysis or corrosion eat it away. Zinc may be replaced after deterioration.

The couplings are available in regular and long lengths.

## Oil-Well Cement

**LONE STAR CEMENT CORPORATION**

A deep oil-well cement, designated Texcor and developed for use in wells at the highest temperatures now encountered or likely to be encountered at depths of 15,000 feet or more, has been announced by Lone Star Cement Corporation, Dallas and Houston.

Mixed with 40 percent water, the cement is rated pumpable in excess of eight hours at 200° F. to provide an increased factor of safety in oil-well cementing and at the same time provide strengths in excess of 5000 pounds in 24 hours and 6000 pounds in 48 hours.

In mixing a slurry with Texcor, excess mixing water is automatically indicated by appearance of excessive surface bubbles in the slurry tub, providing a safeguard against use of too much mixing water. In development of the product, engineers had in mind special problems of squeeze jobs where long pumpability, low initial viscosity and maximum density are necessary for satisfactory results under difficult operating conditions.

### Oxy-Acetylene Cutting

The Linde Air Products Company, 30 East 42 Street, New York, has issued a revised edition of its Booklet 4062B, "Opportunities for Profits with Portable Machine Cutting." It describes advantages of oxy-acetylene cutting with portable machines, diversity of operations that can be performed, and a variety of applications. New profitable "hints and kinks" on the use of these machines have been added. The general operations possible—straight-line cutting, bevel-cutting, shape-cutting, circle cutting, and heavy cutting—are illustrated, and a number of views of cut edges are given to illustrate the results of correct and incorrect cutting techniques. A section on suggestions for extending the usefulness of portable machine-cutting has been enlarged, and a new page describing a special setup for templet-tracing has been included.

### Pumps

Allis-Chalmers Manufacturing Company, Milwaukee, has issued a 40-page Bulletin B-6146 on pumps for services requiring a single-stage double-suction centrifugal pump. In addition to construction features, pump dimensions, normal and special application data, the bulletin presents friction tables, head-capacity tables, and other pump engineering information.

## Electric Welder

**EMERSON ELECTRIC MANUFACTURING COMPANY**

A line of four AC arc welders of 75-, 150-, 200- and 300-ampere capacities has been announced by Emerson Electric Manufacturing Company, St. Louis.

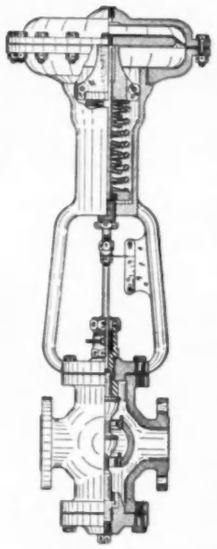
The welders feature an inclined selector panel for clear vision and easy selection of heats from an erect position; heavy-duty on-and-off line switch on selector panel and protected plug and jack connections to eliminate danger of personal injury or damage from accidental contact with connections while in service; drip-proof storage space between selector panel and cabinet front for accessories; panel cover for protection against accumulation of dirt and accidental damage; ventilating louvers on top and sides, and transformer coils wound with copper magnet wire with flexible double-spun glass insulation to withstand temperatures in excess of 1000° F. and to resist moisture, grease and acid.

**Emerson Electric's Arc Welder**

## Motor Valve

**HANLON-WATERS, INC.**

A motor valve, designated Type 86 and employing frictionless roller guide, with rollers running inside of an enclosed spring barrel on a concentric machined surface designed to provide positive alignment between the diaphragm plate and the stuffing box, has been announced by Hanlon-Waters, Inc., Tulsa.



Yoke of the valve is styled to provide ample room for repacking the stuffing box or for mounting attachments. A travel indicator shows the travel in inches from the closed position on the scale plate mounted on the yoke arm. Body restriction has been minimized to permit inner valve to dominate flow through full travel.

Inner valves are of high-parabolic type, fully reversible in the field without use of special tools or additional parts.

The motor valve is available with iron or steel bodies, and with a number of inner valve and seat materials. Flanging of any series and some bodies with special flange facings are available from stock.

### Valves

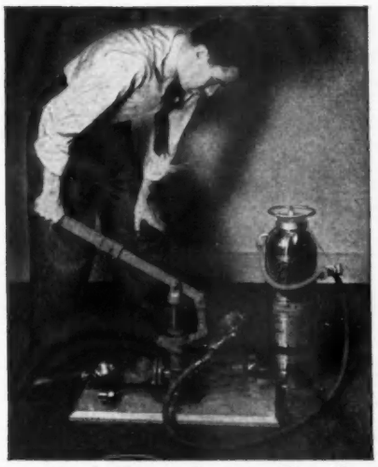
Merco-Nordstrom Valve Company, 400 Lexington Avenue, Pittsburgh, has issued Bulletin V-136 discussing performance records of the company's Hypreseal valves in mud line service. Photos show valves removed for inspection after drilling use, and the bulletin describes the Merchrome coating process and its application to mud-line service. Sizes listed are 2-, 3- and 4-inch, with tables giving specifications covering dimensions and pressure ratings.

## Test Pump

**AMERICAN-LaFRANCE-FOAMITE CORPORATION**

A test pump designed to determine maximum safe life of fire extinguishers, designated Testal pump, has been announced by American-LaFrance-Foamite Corporation, Elmira, New York.

It tests hydrostatically the shell and hose for strength through the hose and nozzle. It flushes interior and exterior of the extinguisher, facilitating testing with routine maintenance. Flushing and testing water flows automatically



**American-LaFrance-Foamite Test Pump**

through the pump, without the pump operating. A few strokes are required to bring the extinguisher up to the test pressure.

## Masks

**MINE SAFETY APPLIANCES COMPANY**

Two masks designed to provide respiratory protection against particles of harmful dust and to guard the wearer's eyes from flying dust and grit by a light transparent plastic shield, designated Dustfoe-Eyeshield assembly and Comfo-Eyeshield assembly, have been announced by Mine Safety Appliances Company, Braddock, Thomas & Meade Streets, Pittsburgh.

The eyeshield is designed to deflect small flying particles and to afford full unobstructed vision. It is removable and replaceable, and has a rubber-reinforced edge.

In the Dustfoe-Eyeshield combination, the respirator is compact to afford unobstructed vision in every direction. It features United States Bureau of Mines-approved protection against harmful dusts, low breathing resistance, easy maintenance, soft sponge-rubber face cushion, foolproof exhalation valve and protective filter cover. The filter is replaceable. Metal parts are aluminum.

In the Comfo-Eyeshield assembly, the wearer has the protection provided by the Comfo respirator, equipped with twin filters of large area for low breathing resistance. Replaceable filters are protected by metal covers, and the flexible rubber facepiece provides a comfortable fit on any face. All filters, either for dust, fumes or mist, are approved by the United States Bureau of Mines.

## Flexible Couplings

The Falk Corporation, Milwaukee, has issued Bulletin 8100 describing its line of five Airflex couplings. It contains typical installation views, a discussion with example illustrations of the coupling's rubber-loading-in-shear principle, dimension drawings and tables of each type of coupling, and a section of suggestions on coupling selection.

## Stack Blower

The Inferno Company, . Shreveport, has issued Bulletin 22 on its steam stack blower. The product is streamlined in design, made of malleable iron and equipped with stainless steel nozzle jets.

## Butterfly Valve

**R-S PRODUCTS CORPORATION**

A hand-wheel operated butterfly valve with internal parts machined to assist operation and provide a tight fit between housing and vane has been announced by R-S Products Corporation, 4530 Germantown Avenue, Philadelphia.

A pair of adjustable stops are designed to stop the vane in either of two set positions between open and closed, permitting constant duplication of any set maximum or minimum opening in addition to full-open and tight-closed positions. Valves have a graduated dial and pointer for exterior determination of the butterfly vane.

**R-S Products' Butterfly Valve**

The hand-wheel assembly operates through a self-locking worm and quadrant, and is arranged on the side of the housing so the wheel can be located in the most convenient position. Wheels, worm and quadrant can be omitted and a lever connected directly to the butterfly vane shaft for hand-lever operation.

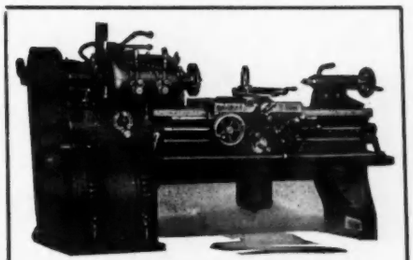
The line includes a standard range of sizes from 2 to 48 inches, for working pressures up to fifteen pounds.

## Filters

Staynew Filter Corporation, Rochester, New York, has announced a new 44-page catalog illustrating and completely describing its filters for compressed air, gases, liquids, engine and compressor intake, and for building ventilation. It contains photographic illustrations, sectional drawings, diagrams, specification charts, and detailed engineering data.

## Sucker-Rod Couplings

W. C. Norris, Manufacturer, Tulsa, has issued Bulletin 30 describing his sucker-rod couplings employing zinc to provide cathodic protection for rods and tubing.

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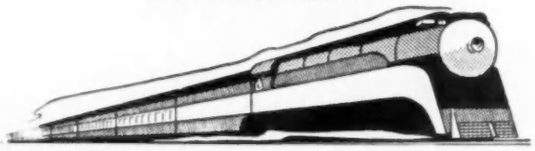

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In the following index is shown only the advertisers having advertisements in this issue.


*American Iron & Machine Works Co. ..... IV Cover
J. M. Axtell ..... 64
Wm. M. Barret, Inc. ..... 64
*Bethlehem Steel Co. ..... 25
Bowen Company of Texas ..... 68
*The Brewster Co. ..... 50
*Buckeye Traction Ditcher Co. ..... 4
Jo H. Cable ..... 71
*Cardwell Manufacturing Co. ..... 1
The Continental Supply Co. ..... 3
*Darling Valve & Manufacturing Co. . 59
Dedman Foundry & Machine Co. ... 56
Fort Worth Laboratories ..... 64
*Gatke Corp. ..... 65
General American Transportation Corp. ..... 2
*H. P. Gott Manufacturing Co. ..... 69
*Gray Tool Co. ..... 31
*The Gulf Publishing Co. ..... 31 and 67
Gulf States Utilities Co. ..... 30
Hardway & Cathey ..... 64
C. J. Harter, Machinery ..... 71
*Hazard Wire Rope Division . . III Cover
Houston Laboratories ..... 64
*Hughes Tool Co. ..... I Cover
*Hunt Tool Co ..... 27
The International Nickel Co. ..... 38
*Johns-Manville Corp. ..... 61
M. M. Kinley Co. ..... 68
*Lane-Wells Company ..... 23
*Maintenance Engineering Corp. ..... 67
*Martin-Decker Corp. ..... 71
Hotel McAlpin ..... 59
*Mission Manufacturing Co. ..... 34-35
Oil Well Supply Co. ..... 6
*The Parkersburg Rig and Reel Co. . 19
*Patterson-Ballagh Corp. ..... 30
*Pelican Well Tool & Supply Co. ... 55
Petroleum Electric Power Association ..... 29
*Raybestos Manhattan, Inc. ..... 57
H. F. Smiley ..... 64
Southern Pacific ..... 72
The Thermoid Co. ..... II Cover
*Thornhill-Craver Co. ..... 68
Edgar Tobin Aerial Surveys ..... 54
United States Steel Corp. ..... 6
York Oilfield Supply Co. ..... 68


* Indicates that detailed information on the manufacturer's products or services may be found in the 1941 edition of The Composite Catalog of Oil Field & Pipe Line Equipment.